АЛЕКСЕЙ ГОЛОЩАПОВ

bhv®

Google Android

системные компоненты и сетевые коммуникации

ДОСТУП К СИСТЕМНЫМ КОМПОНЕНТАМ

ЛОКАЛЬНЫЕ СЛУЖБЫ

СЕТЕВЫЕ КОММУНИКАЦИИ

СЕРВИСЫ GOOGLE

РАБОТА С ОБОРУДОВАНИЕМ МОБИЛЬНОГО ТЕЛЕФОНА

PRO
ПРОФЕССИОНАЛЬНОЕ ПРОГРАММИРОВАНИЕ

Материалы на www.bhv.ru

Алексей Голощапов

Google Android

системные компоненты и сетевые коммуникации

Санкт-Петербург

«БХВ-Петербург»

2012

M > D 681.3.06
; ; D 32.973.26-018.2
=

=hehsZih\.: E

= *RRJOH $QGURLG kbkl_fgu_ dhfihg_glv_ ibbkl_l_\u_
;O<l_l_j[mj]12. ² 384 k b²e(ljhn_kkbhgZevgh_ ijh]jZffbjh

ISBN 978-5-977-06663

Dgb]Z ihk\ys_gZ jZ[hlZ[hfld^ey fh[bevguo mkljhckl\ ih^ mbijZ
hgghc kbkl_fu $QGURLG JZkkfZljb\Z_lky kha^Zgb_ ijbeh`_
dhfihg_glh\ b kem`[$QGURLG mijZ\e_gb_ k_l_\ufb kh_^bg_
\mx k_lv fh[bevgulc BUU_jb_ibkZgZ jZ[hlZ k h[hjm^h\Zgb_f fh
$QGURLG \kljh_ggufb ^ZlqbdZfb dZjlhc iZfylb \b^_hdZf_jh
lj_[e_gb_f l_e_nhgZ lhdZaZgh bkihevah\Zgb_ k_l_\uo k_b\bk
eh`_gbyoj_^he_gb_ dhhj^bgZl gZ\b]Zpby *HRFRGLQJ dZjlu
\ dgb]_ ijbf_ju ijbeh`_gbc fh`gh kdZqZlv ih kkued_ IWS
b gZ kljZgbp_ dgbwlv.lgZruk Zcl_

>eyjh]jZffbklh\

M > D
; ; D -018.2

=jmiiZ ih^]hlh\db ba^Zgby

=eZ\guc j_^Zdlhj	?dZl_jbgZ Dhg^mc
AZf]eZ\gh]h j_^Zc	B]hjv Rbrb]bg
AZ\ j_^Zdpb_c	=jb]hjbc >h[bg
J_^Zdlhj	GbgZ K_^uo
Dhfivxl_jgZy _jkld	GZlZevb DZ_hZ\Z
Dhjj_dlhj	<bdlhjby llj_hh\kdZy
>baZcg k_jbb	Bggu LZqbghc
Hnhjfe_gb_ h[eh`dl	?e_gu ;_ey_\hc
AZ\ ijhba\h^kl\hf	GbdheZc L_jkdbo

Ebp_gaby B> ‹ hl Ih^ibkZgh \ i_qZlv.
NhjfZl ×100 1/16. l_qZlv hnk_lgZy Mk30,96._q e
LbjZ2 wdadZ ‹
;O<l_l_j[mj] KZ_jl_j[mj] BafZceh\kdbc ij
KZgblZ jvhb^_fbheh]bq_kdh_ aZdexq_gb_ gZ ijh^mdpbx
‹ > hl] \u^Zgh N_^_jZevghc kem`[hc
ih gZ^ahjm \ kn_j_ aZsblu ijZ\ ihlj_[bl_ qbcybq_ e Zl_hZem
Hli_qZlZgh k]hlh\uo ^bZihablb\h\
\ =Ml Lbih]jZnby GZmdZ
KZ_jl_j[mj] ebgby

ISBN 978-5-977-06663

H] e Z \ e _ g b _

< \ _ ^ _ g b _ 1

G Z d h] h j Z k k q b l Z g Z w l Z d g b] Z 1
D j Z l d h _ h i b k Z g b _] e Z \ 2
B k o h ^ g u _ d h ^ u i j b f _ j h \ 5
; e Z] h ^ Z j g h k l b 5

Q : K L V H ; S B ? K < ? > ? G B Y 7

= e Z \ Z l h ^ d e x q _ g b _ f h [b e v g h] h m e k y j h _ c k l b j Z h ^ Z g b y
b h l e Z ^ d b i j b e h _ g b c 9

K j _ ^ Z j Z a j Z [h l d b S D K $ Q G U R L G 9
G Z k l j h c d Z f h [b e v g h] h e l y _ e h l e Z ^ g d Z b i j b e h _ g b c 10
M k l Z g h \ d Z j _ ` b f Z h l e U Z B d b q _ j _ a 11
M k l Z g h \ d Z ^ j Z c \ _ j Z 8 6 % 12
< a Z b f h ^ _ c k l \ b _ f h [b e v g h] h l _ e _ n h g Z k ' ' 0 6 12
A Z m k d b b g k l Z e e y p b y Z f j h [b e l Z g u c l _ e D E n b l g s e a 13
J _ a x f _ 14

= e Z \ Z > h k l m i d k b k l _ f g u f d h f i b h g k _ g l _ Z d f k _ j \ b k Z f 15

D h f i h g _ g l u k b A n b r o f d u 15
K b k l _ f g k u e _ m ` [u 15
H [t _ d I n t e n t 18
I n t e n t n b e v l j u 18
K b k l _ f g u _ d h g h \ Z g c ^ _ j u 19
< k l j h _ g g u _ [Z a u _ ^ Z g g u o 19
M k l Z g h \ d Z l j _ [m _ f u o \ Z i j b e r h _ g b g c b 20
J _ a x f _ 21

Q:KLV. ;:AH<U? NMGDPBB L?E?NHG:
B K?L?C KHLH<HC K<YAB 23

=eZ\ZIhemq_gb_ bgnhjfZpbb b k_e b nkhgl h\hc k\yab 25

BgnhjfZpby h l e nhg 25
Hij_^_e_gb_ lbiZ b_k_nhgZlh\hc k\yab 25
Hij_^_e_gb_ [Zah\hc klZgpbb khlh\hc k\yab 27
Hij_^_e_gb_ khklhygby \uah\Z 28
Ihemq_gb_ bgnhjfZpbb h jhmfbg 28
Bkihevah\Zgb Telehzrky Manager ijbeh`_gbb 28
>hklmi d-6Z,l 34
Chklhygby SM-dZjlu 35
>hklmi SM-dZjl_ ba ijbeh`_gby 35
I_j_o\Zl baf_g_gbc ikZjZlfh\ylh\yl_e nhgZ 37
AZimkd b hklZgh\dZ ijhkemrb\Zgby baf_g_gbc khklh 38
Baf_g_gb_ mjh\gy kb]gZeZ 39
Baf_g_gb_ [Zah\hc klZgpbb khlh\hc k\yab 40
Fhgblhjbg] khklhygby gb ydek j\bkm 40
Ijbeh`_gb_ ^ey ijhkemrb\Zgby baf_g_gbc khklhygby 41
Bkihevah\Zgb_ wfmeylhjZ ^ey l_klbjh\Zgby ijbeh`_g 46
J_axf 48

=eZ\ZH[jZ[hldZe_nhgguo \uah\h\ 49

Bkihevah\Zgb_ wfmeylhjZ ^ey l_klbjh\Zgby h[jZ[hlb 49
BfblZpby l_e_nhggh]h DDMSah\Zba 49
BfblZpby l_e_nhggh]h \uah\Z f_`^m Android wfmeylhjZ 51
MklZgh\dZ jZaj r gbc 52
Bkihevah\Zgb_ Intent-ley\kha^Zgby l_e_nhgguo \uah\h\ 53
<uah\ l_e_nhggh]h Z[hg_glZba ijbeh`_gby 54
I_j_o\Zl bykob a\hgdh\ 58
J_axf 61

=eZ\ZHlijZ\dZ b ihemSMSgbb eh`_gb f 62

Bkihevah\Zgb_ wfmeylhjZ ^ey hlijZ\db 606 62
HlijZ\dZ 606 ba ijbeh`_gby 64
HlijZ\dZ 606 k ^Zggufb 65
>_e_gbSMSgZ njZ]f_glu 65
MklZgh\dZ jZaj_r_gbc ^ey jZ[hlu 606 65
Ijbeh`_gby hlijZ\dZ 606 66
KljmdlSMSkhh[s_gby 70
I_j_o\Zl \oh^ysbkh 606 gbc ijbeh`_gh f 71

OjZg_gb_ SMS gZ fh[bevghf mk.lj.h.c.k.l.\ 74
>hklmi d dZ lSMSh].Z.f 74
>hklmi d iSMSykhh[s_g.b.y 79
J_ax.f 82

Q:KLWI. K?L?<UD HFFMGBD:PB.B 83

=eZ\6ZFh[bevgucglB jg 85

Kha^Zgb_ k_l_\uo .k.h ..^.b.g ..g.b.c 85
F_g_^`_j k_l_\uo kh ..^.b.g ..g.b.c 85
OZjZdl_jbklbdb fh[bev.g.h.c ..k ..l.b 86
Ihemq_gb_ bgnhjfZpbb h k_l.b ..\ ..ij.b.e.h.` ..g.b.b 86
Fhgblhjbg] k_l_\h]h ..lj.Z.n.b.d.Z 89
Ihemq_gb_ bgnhjfZpb.b ..h ..lj.Z.n.b.d 89
Ijbeh`_gb_ ^ey fhgblhjbg]Z k ..l ..\h]h ..lj.Z.n.b.d.Z 90
<kljh_gguc [j.Z.m.a ..j 92
<b^`_WebView 93
Bkihevah\Zgb_ WebView.Z 93
AZ]jmadZ ^Zgguc WebView.^`_l 95
KhojZg_gb_ ihevah\Zl_e v.k.d.b.o ..g.Z.k.l.j.h ..d 97
J_ax.f 106

=eZ\ZMijZ\e_gb_ Wi-Fi kh_^bg_g.b.y.f.b 107

MijZe_gb_ kh_^bg_g.b ..f 107
F_g_^`_Wi-Fi kh_^bg ..g.b.c 107
JZaj_r_g.b.y 108
Khklhygb_ kh ..^.b.g ..g.b.y 108
Hlke_`b\Zgb_ khklhygb.y ..kh ..^.b.g ..g.b.y 108
MijZ\e_gb_ ih^dexq)Lgb_ hlke_`b\Zgb_ khklhygby kh_
ba ijbeh` ..g.b.y 110
MijZ\e_gb_ gZklhgb_ Fidk.Zf_b^ bgb.y 115
OjZZdl_jbklbdb kh ..^.b.g ..g.b.y 118
IP-Z^j_kZ.p.b.y 118
Ihemq_gb_ bgnhjfZ WebFi \hijk_e b` ..g.b.b 119
DhgnB]mjZ WebFi kh_^bg ..g.b.y 123
KdZgbjh\Zgb_ lhq ..d ..^.h.k.l.m.i.Z 128
Fhgblhjbg] mjh\gy kb]gZeZ b kdhjhklb i_j_^Z.q.h ..^.Z.g.g
J_ax.f 137

Q:KL VV. F?KLHIHEH@?GB?G:<B=:PB.Y 139

=eZ\8Z Hij_^_e_gb_ f_klhih.e.h.`..g.b.y 141

Bkihevah\Zgb_ Google API \ wfmey.l.h.j. 141
K_j\bku b ijh\Zfc_^klhih.e.h.`..g.b.y 141
Lbiu ijh\Zc^_jh\ f_klhih.e.h.`..g.b.y 142
JZaj_r_gby ^eykjZjh\Zuc^_jZfb f_klhih.e.h.`..g.b.y 144
Ijbeh_gb_ ^ey ihbkdZ ^hklmigu.o..ij.h.\Z.c.^..j.h.\ 144
Hij_^_e_gb_ emqr_]h..ij.h.\Z.c.^..j.Z 146
Djbl_jbb ^ey hij_^_e_gby emqr..]h..ij.h.\Z.c.^..j.Z 147
Ihbkd b hij_^_e_gb_ emqr\]hijeh\Zg^b.j.Z 148
Bkihevah\Zgb_ Android ^ey Zl_klbjh\Zgby ij.b.e.h.`..g.b.c 151
Hij_^_e_gb dhhj^b.g.Zl 152
H[gh\e_gb_ f_klhih.e.h.`..g.b.y 153
Ijbeh`_gb_ ^ey fhgblhjbg]Z baf_g_gbc dhhj^bgZl
b khklhygby ijh\Zc^..j.Z 154
J_ax.f.. 157

=eZ\9Z K_j\bk Geocoding 158

Bkihevah\Zgb Geocoding 158
Reverse Geocoding 159
Hlh[jZ`_gb_ f_klhih.e.h.`..g.b.y..g.Z..d.Z.j.l.. 163
Forward Geocoding 168
J_ax.f.. 173

=eZ\Z. Bkihevah\Zgb Google Maps \ ijbeh`_gb.y.o 174

Ihemq_gb_ Maps API Key 174
;Zah\u_ d.e.Z.k.k.u 176
<b^`_ MapView 177
DeZ MapActivity 178
DeZ MapController 178
DeZ GeoPoint 179
Bkihevah\Zgb MapView \ ijbeh`_gb.b 180
MijZ\e_gb_ fZkrlZ[bjh\Z.g.b..f..d.Z.j.l.u 185
>h[Z\e_gb_ f.Z.j.d..j.Z 186
Baf_g_gb_ fZkrlZ[Z dZjlu\bk^`ihl_ SeekBar 187
J_ax.f.. 194

Q:KL**V**. J:;HL:K H;HJM>H<:GB?F
FH;BEVGH=H MKLJHCKL<: 195

=eZ\Z. DZjlZ iZfydbnZceh\Zy kbkl_fZ 197

Ih^dexq_gb_ dZjlu wZfyelyhj_ 197
NZceh\Zy kAnkroidZ 198
KlZg^Zjlgu_ ^bjAndroid 199
Ijh_jdZ khklhygby dZjlu iZfylb 202
KhojZg_gb_ b ql_gbSD-dZZjceh\k 203
J_ax.f_ 212

=eZ\Z. Bkihevah\Zgb_ \b^_hdZf_ju 213

JZ[hlZ k dZfijjhech`_gbb 213
IZjZf_lju dZf_ju 214
Ihemq_gb_ iZjZf_ljh\ dZf_ju \ijbeh`_gbb 214
Ih^^_j`dZ jZaebqguo j_`bfh\ dZf_jhc 216
Bkihevah\Zgb_ Intent-dely\hldjulby dZf_ju 221
<kljZb\Zgb_ dZf_ju \ ijbeh`_gby 224
MijZ\e_gb_ jZ[hlhc dZf_ju 227
>h[Z\e_gbjeh\\ 231
AZo\Zl bah[jZ`_gby 236
Bkihevah\Zgb_ Z\lhnhdmkZ 241
J_ax.f_ 246

=eZ\Z. <kljh_ggu_ ^Zlqbdb 247

;b[ebhl_dZ ^ey jZ[hlu k ^Zlqbdzfb 247
MijZ\e_gb_ ^Zlqbdzfb 247
Ihbkd ^hklmiguo ^Zlqbdh\ gZ fh[bevghf mkljhckZ 249
Hlke_`b\Zgb_ baf_g_gbo ^Zlqbdh\ gZ fhuagZq_gbc 251
JZ[hlZ k ^Zlqbdzfb \ijbeh`_gbb 252
>Zlqbd hk_s_ggh klb 252
>Zlqbd jZkklhygby 256
>Zlqbd hjb_glZpbb 258
:dk_e_jhf_lj 263
>Zlqbd mjh\gy fZ]gblghlh ihey 267
>jm]b_ ^Zlqbdb ^hklmigu_ gZ fh[bevgu mkljhckZ 269
BfblZpby ljZ[h_gkh^jey wfmeAndroidZ 269
J_ax.f_ 271

=eZ\Z. MijZ\e_gb_ ^bkie_f 272

>hklmi d ^bkie_x fh[bevgh]h mklj.h.c.k.l.\Z 272
F_g_^`_j h.d.h.g 272
IZjZf_lju ^bkie_y fh[bevgh]h mklj.h.c.k.l.\Z 272
MijZ\e_gb_ yjdhkl.v.x w.d.j.Z.g.Z 276
J_ax.f. 281

=eZ\Z. >hklmdi Zddmefmhjghc [Zl.Z.j. 282

F_g_^`_j bklhqgbd.Z i.b.l.Z.g.b.y 282
Hlh[jZ`_gb_ klZbkihbedvbah\Zgby [.Z.l.Z.j. b 290
J_ax.f. 292

=eZ\Z. MijZ\e_gb_ wg_j]hihlj_[e_gb.g.Z 293

F_g_^`_wjg_j]hihlj_[.e. g.b.y 293
MijZ\e_gb_ wg_j]hihlj_[e_gb.g.b.j.h.f.\.d.b 294
J_ax.f. 300

Q:KLV. KBKL?FGU? K?J<B.K.U 301

=eZ\Z. Ihemq_gb_ bgnhjfZkb.f. 303

DeZAkdivityManager 303
BgnhjfZpby h dhgnb]mjZp.b.b. mklj.h.c.k.l.\Z 309
BgnhjfZpby h k.b.k.l. f. 313
>hklmigZy iZfylv mklj.h.c.k.l.\Z 313
<uihegyxsb_ky ij.h.p. k.k.u 315
<uihegyxsb_ky k.e.m.`.[.u 316
<uihegyxsb_ky aZ^Zg.b.y 317
Ihke_^gb_ \uiheg_gg.u aZ^Zg.b.y 319
Ijhp_kkhklhyhb [d.b 320
L_jfbgZe \ kAndroid 322
J_ax.f. 328

=eZ\Z. MijZ\e_gb_ ihevah\Zl_m\v_k^dhfeb_g.b.y.f.b 329

F_g_^`_j m_^h.f.e. g.b.c 329
Kha^Zgb_ m_^.h.f.e. g.b.y 330
J_ax.f. 335

=eZ\Z. Khaa^Zgb_ ihevah\Zl_evkdb.o...hih_s_gbc.....336
F_g_^`_j hih_s_gbc.....336
Bkihevah\Zgb_ hih_s_gbc.....337
J_ax.f_.....343

=eZ\Z. ;mn_j h[f_gZ ^bey jZ[hlu kl_dklhf.....344
F_g_^`_j [mn_jZ h[f_gZ.....344
Kbgl_a j_qb gZ hkghl_dklZ.....348
J_ax.f_.....353

Ijbeh`_gb Mklzghl jZf_jh\.....355

Ebl_jZlmbjZ -j[_kmjku.....359

Ij_^f_lguc mdZaZl_ev.....361

<_^_gb_

Dgb]Z dhlhjmx \u ^_j`bl_ \ jmdZo y\ey_lky eh]bq_ [h^bZ\ghc
"*RRJOH $QGURLG ijh]jZffbjh\Zgb_ ^ey ^hklmiZ d k_l_\uf dhff
l_l_j[mj] K ihfhsvx wlhc dgb]b \u gZmqbl_kv kha^Z
amxsb_ \hafh`ghklv ^ey ^hklmiZ d k_l_\uf dhff
m^Ze_gguf k_j\bkZf Z lZd`_ ehdZevguf kem`[Zf b `_
k kbkl_f_ $
Android.
Ih f_j_ bamq_gby dgb]b \u [m^_l_ kha^Z\Zlv ijbeh
ijZ\eyxsb_ SMS-khh[s_ glbye_nhgZ u_gdb mijZ\eyxsb_ k_bl_
g_gbyfbl bfevgh]h l_e_nhgZ bkihevamxsb_ \hafh`ghk
ihabpbhgbjh\Zgby b k_l_Google k^ejy\bkhj\^_e_gby f_klhi
<u kfh`_l_ mijZ\eylv ba ijh]jZffgh]'h fbl bh^Zvgh]e_ahef_
\kljh_ggufb ^ZlqbdZfb dZjlhc iZfylb \b^_hdZf_jhc
Z lZd`_ bkihevah\Zlv \ k\hbo ijbeh`_gbyo fgh]h ^jm
nmgdpbhgZevghklb ij_^hklZ\ey_fhc fh[bevguf kem`[b_nh

GZ dh]h jZkkqblZgZ wlZ dgb]Z

Dgb]Z ij_^gZa\gZ\q\jmZx hq_j_^Z\a^Zy\hlqbgZ\a m`_ xbf_
sbo hiujlh]jZffbjh\Zgbyh^\eevguo mkljhckl\ gZ\ndeZ\dmQbjf_
lZl_eve`^hg bf_lv ij_^klZ\e_gb_ h[Zjobl_dlmj_ kbkl_fu
dhfihg_gbZbo \aZbfh^_ck\l\mbkh[hc b dhg_qgh bf_lv
ijbeh`_gbc ^ey \ bgl_]jbjh\Zgghc kj_^_Eglj\sejZ[bl\Zb_e
lZd`_ ^he`_g mf_lv kha^Z\Zlv ijbeh`_gby k]jZ\mbg_k
l_jn_ckhf^ihkdhevdm lZdb_ ijbeh`_gby\Zlv gm^ij
ly`_gbb \k_c dgb]b b `_eZl_evgh bf_lv ohly [u [
kem`[ b ijbeh`_gbc ^ey ^hklmiZ d ^Zgguf \ kbkl_f_ $
?s_ h^gh lj_[h\Zgb_ ij_^ty\ey_^hg_Zebqbl_Zlf_hf_kevgh
nhgZ k kbkl_f_c;hevrbgkl\hf_ijb\ ijbeh`_gbc kha^Z\Z
dgb]_kjZblZgh gZ bkihevah\Zgb_ \ j_Zevghf fh[bevg
lZf]^_ _klv \hafh`ghklv ^ey l_klbjh\Zgby b aZimkd
wfmeyAndroid gh \k_ `_ h^gh]h wfjmZ\ehylhjZbe^e_gbyfbjkZ
kfZljb\Z_fufb \ wlhc dgb]kl_Zlhm^h l g_^h
Ijbf_ju ijbeh`_gbc jZkkqblZgZ Android 2.3.3 (API Level 10). H^
gZdh\k_f g_h[yaZl_evgh bf_lv fh[bevgh_ Android 2.3.3

Fh`gh bkihevah\Zlv b [he__ jZggb_j Andrkd2b1 bgZ^iZb_
Android 1.6, gh g_h[oh^bfh mqblu\Zlv qlh ijb i_j_dhfibhey
e__ jZggxx \Andrkdk \hafh`gh ijb^_lky ba dh^Z ijbeh`_
lhjmx nmgdpbhgZevghkey_fim_x^hk[Zbh Android SDK dhlhjZ
klZe^Zhklmhc lhevdh \ iha^gbo _jkbyo kbkl_fu

DjZldh_ hibkZgb_]eZ\

Dgb]Z khkl6hqZkla_c dhlhju_ 20h^eZjbZh^gh]h ijbeh`Z_g
e__ ijb\h^blkdyh djZibkZgb_ dZ`^hc ba]eZ\
l_j\Zy qZklv ²d'gb]sb_ k_^._gbylhc qZklb jZkkdhZu\
kljhcd_ kj_a^Z[hjZdb b fh[bevgh]h l_e_nhgZ ^ey l_klb
b h[sb_ k_^_gby h kbkl_fguo dhfihg_glZc Android k bhkeim`f[bZ
[m^_f jZ[hlZlv gZ_gbjhlylhc dgb]b
^ =eZ\Zlh^dexq_gb_ fh[bevgh]h mkljhckl\Z ^eylle_Zk^l
ijbeh`_gbc
Hibku\Zxlky h[sb_ lj_[h\Zgby d dhfivxl_jm jZajZl[hl
db Zglj hcdZ b ih^dexq_gb_ fh[bevgh]h mkljhckl\Z d
b l_klbjh\Zgby ijbeh`_gbc JZkkfZljb\Zxlky mklZ_gh
jh\ hj]Zgbaa Zbfyh^_ckl\by fh[bevgh]h mkljhckl\Z hk
^ysbfb \ kh Android SDK b kh kj_^hcldZ Eclipse
^ =eZ\Z>hklmi d kbkl_fguf dhffbhg_glZuf k_j\bkZf
< wlhc]eZ_ ^Zxlky h kb^l_gby o dhfihg_glZc Android
Bo rbjdb_ nmgdpbhgZevgu_ \hafh`ghklb fh`gh ijbf
ijbeh`_gbyo Hibku\Zxlky h[sb_ ijbgpbiu ^hklmifZ
guf dhfihg_glZf ehdZevguf kem`[Zbjdb_ Zbik_Zl nhuf_bk_
kZf ij_^hklZ\eyo Google ey ihevah\Zl_e_c fh[bevgh]h l
<lhjZy qZklv²d'gb]ah\u_ nmgdpbb lk_el_kbhgZhc k\yab Z
qZklv hibku\Z_l jZ[hlm k hkgh\gufb nmgdpbyh Android [b
b k_lyfbh\hc k\yab b jZ\e_gb_ l_e_nhggufb \uah\Zfb hlij
SMS-khh[s_gbc
^ =eZZ.lhemq_gb_ bgnhjfZpbb h l_e_nhg_ b k_lb khlh
< wlhc]eZ_ ^Zxlky [Zah\u_ ihgylby h lbiZo k_l_c k
ky bkihevah\Zgb_ f_g_^`_jZ l_e_nhgguo kh_^bfZ_pbb
h k_lb khlh\hc k\yab b hi_jZgby_b ^dhygmbjZ\jebjh\Zgby
^ =eZ4.ZH[jZ[hldZ l_e_nhgguo \uah\h\
< wlhc]eZ_ ^Zxlky k_^_gibyb a\hh^blvdZ_de_nhggu
g_ihkj_^kl_ggh ba dh^Z ijbeh`_gby JZkkfZljb\
jZ[hlZxsbo \ nhgh\hf j_`bf_ b ijbeh`b_gby^ey_ehlkle
\uah\h\ gZ fh[bevghf mkljhckl_
^ =eZ5.ZHlijZ\dZ b ihe SMS ijbeh`_gb_f
< wlhc]eZ_ jZkkfZljb\Zxlky \hafh`ghklb ijbe SMS-gb
khh[s_gbyk fbkl_fZ $QGURLG ij_^hklZ\ey_hmgdpbhg^
guf \hafh`ghklb fh`gh ihe SMS ihevah\heyy hlijZ\eylv b -ikhemqZ_lv6
ijbeh`_gbc

Lj_lvy qZklv²d'gKb]lb_\u_ dhffmg.bAd^Z_pkbvbjZkkfZljb\Z_lky
fh[bevguf Bgl_jg_lhf bWi-Fi_lyhb^dexq_gb_ d k_l_\uf dh
fh[bevgh]h mkljhckl\Z ihemqb_ghb_dhbggnbhjmfZZpbb mijZ
\ufb ih^dexqbqyfb ba dh^Z ijbeh`_gby

^ =eZ\ZFh[bevgBgd_jg_l

< wlhc]eZ\kfZljb\Zxlky ih^dexq_gb_ b dhgnb]mjZp
Bgl_jg_lZ gZ fh[bevghf mkljhckl_ Hibku\Z_lky bhg
dZ ba hjb_gby JZkkfZljb\Z_lky nmgdpbhgZevgbk
[jZmaWjZKit^eykbhevah\Zgby _]h \ kh[kl_gguo ijbeh`

^ =eZ\ZMijZ\e_WiFi_kh_^bg_gbyfb

< wlhc]eZ_ ^Zxlky k_^_gby h[WiFi]Zbgb\aZpbb^_kc_k
k gbfb fh[bevgh]hl\mZklyjZkkfZljb\Z_lky kha^Zgbdhlhjbu
fh]ml hkms_kl\eyhvZgbZglhjq_d ^hklmiZ b ih^dexqv_g
gh]h mkljhckl\Z qblZlv oZjZdl_jbklbdb k_lb hlke
kb]gZbeZdhgnb]mjZpbWi-Fi_l_c

Q_l_jlZy qZklv? "dFg_bkl]hihehe`_gb_ b "gZ<\bvlZhpbyqZklb
kfZljb\Z_lky jZ[hlZ k ijh\Zc^_jZfb f_klhihehe`_gby b
GoogleMaps bGeocoding: ihemq_gb_ bgnhjfZpbb h f_klhihehe`_
dZjl \ kh[kl_gghu_gibbye ihbkd h[t_dlh\ k iGoogleMapsZjl
khihklZ\e_gb_ Z^j_kZ h[t_dlZ b _]h]_h]jZnbq_kdbo d

^ =eZ\ZHij_^_e_gb_ f_klhihehe`_gby

=eZ\Z ihk\ys_gZ jZ[hl_ k f_g_^`_jh²f LocationManager^gby
hij_^_e_gby b hlke_`b\Zgby baf_g_gbc l_dmsbohd
[bevgh]h mkljhckl\Z JZkkfZljb\Zxlky lZd`_ ihbkd_^
klhihehe`_gby Z\lhfZlbq_kdh_ hij_^_e_gb_ emqr_]h
b bkihevah\Zgb_ ijh\Zc^_jZ ijbeh`_gb_f

^ =eZ\.ZK_j\bGeocoding

< wlhc]eZ_ hibGeocodingk\Zlnbkyk_l_\Zkem`[Z dhlhjZy \hu
ihkl\Ze_gb_]_h]jZnbq_kdbo dhhj^bgZl dZjlu b nbab
K wlhc kem`[hc fh`gh \aZbfh^_ckl\h\Zlv ba ijbeh`_
fh[bevghf mkkl\jh

^ =eZ1Z Bkihevah\dZZgjbGoogleMaps\ ijbeh`_gbyo

< wlhc]eZ_ jZkkfZljb\Z_lky bkihevah\ZgbGoogleAPIb
\ k\hbo ijbeh`_gbyo JZkkfZljb\Zxlky ihemqsAPIKeyb
^ey \hafh`ghklb \kljZbGoogleMapsZjl ijbeh`_gb_ jZ[hlZ
lhfMapView² ki_pbZebabjh\Zggbnf \be^y_gZ\b]Zpbb b hl
f_klhihehe`_gbyhvh\Ze_ey gZ dZjl_

lylZy qZklv ²d'gbZjlhlZ k h[hjm^h\Zgb_f fh[bev.gbWlhZ
qZklv hibku\Z_l ^hklmi d ZiiZjZlghc ieZlnhjf_ fh[bev
e_gb_ \kljh_gguf h[hjmd'ZhlZZlbiylfb \b^_hdZf_jhc ^dZl
dmfmeylhjghc [ZlZjbf_c`be^jafhf[bevgh]h l_e_nhgZ

^ =eZ\Z DZjlZZfylbb nZczyk\bkl_fZ

< wlhc]eZ_ ^Zxlky k_^_gby h ihemq_gbb ^hklmiZ
h __ khklhygbb LZd`_ jZkkfZljb\Zxlky nZbje]hZ\hc kbkl_

iZfylb b fh[bevghf mkljhckl_ kha^Zgb_ dZlZehjch\
eh\ k dZfylb
^ =eZ12Z Bkihevah\Zgbd_Zf_bj^u_h
Hibkuxlky ^hklmi d \b^_hdZf_j_ fh[bevgh]h mkljh
b mijZ\e_gb_ dZfbjhc`_gbyo mijZ\e_gb_ Z\lhnhdZmk
gb_ baZh[gbc khojZg_gb_ \b^_h b nhlh]jZnbc
^ =eZ\Z <kljh_ggu_ ^Zlqbdb
< wlhc]eZ_ ^Zxlky kkljh_ggbyuo ^Zlqbd Zo ^hklAmi-gu
droid. GZ[hj \kljh_ggu o ^Zlqbdh\ aZ\bkbfhklb hl ijhba\h^bl_ey b fh^_eb
L_e_nhg \ aZ\bkbfhklb hl ijhba\h^bl_ey b fh^_eb
^Zlqbdb l_fi_jZlmju ^Z\e_gby hjb_glZpbb mkdkj_
_s_gghklb fZ]gblgh]h ihey b ^j A^_kv qblZl_ev g
gby ihemq_Zx^shklmi d \kljh_gguf ^Zlqbd Zf fh[bev_gh
^_eyxsb_ bo gZebqdkl\gZbmkkljhevamxsb_ bo \hafh`g
^ =eZ\4Z MijZ\e_gb_ ^bkie__f
< wlhc]eZ_ jZkkfZljb\Z_lky ihemq_gb_ b bkihevah
ie__ fh[bevgh]h m^kljhckl\Zgb_ f_ljbd b nbabq_kkdb
ie_y ^ey Zp^bZbilijbeh`_gby gZ dhgdj_lghc fh^_eb fh[
LZd`_ jZkkfZlkb\Zmijz\e_gb_ yjdhklvx ^bkie_y ba ijh]
^ =eZ15Z >hklmi d Zddmfmeylhjghc [ZlZj__
< wlhc]eZ_ jZkkfZkjh\eZxlky Zgb_ f_g_^`_jZ bklhqgl
^hklmiZ d Zddmfmeylhjghc [ZlZj__ ihemq_gb_ ihjbe
klhygbb bklhqgbd Z mjhZgbygZijy`_gby ih^dexq_glbb
jhckl\Zfiljlmj_ b ^jm]bo iZjZf_ljZo
^ =eZ16Z MijZ\e_gb_hwhgjjje_gb_f l_e_nhgZ
< wlhc]eZ_ jZ\Zkflkj bkihevah\Zgbwgf_jgh^hljZ[ehgl
[bevgh]h l_e_nhgZ LZd`^__gZxlky\hafhjbgfhkgygbyb[e
jh\hdeymijZ\e_gjbyp_kkhjhf ih^k_ldhc wdjZgZ b dheZ
]h mkljhckkl\Zevx mf_gvr_gby ihlj_[e_gby wg_j]bb fh
R_klZy qZklv² dgkbkd_fgu_ k_j\kkuwlhc qZklb hibku\Z
k jZaebqgufb kbkl_fgufb k_j\bkAmfbidezjl^hjZagZq_ggu
mijZ\e_gby b fhgblhjbg]Z jZ[hluhkbkl\fhfhelijb\d ^ey b
gh]h \aZbfh^_ckl\by k ihevah\Zl_e_f Z lZd`_ keebmq[m
^hihegbl_evgmx nmgdpbhgZevghklv ^ey ihevhgZ\Zl_ey
^ =eZ17Z lhemq_gb_ bgnhjfZpbb h kbkl_f_
< wlhc]eZ_ jZkkfZljb\Zxlkyemkqihkbyu bignhjfZpbb
Android \uihegyxsboky \ ^Zgguc fhf_gl ijhp_kkZo hke
lj_[e_gbb b ^hklmighklb iZfylb LZd`_ jZkkfZljb\Zx
_ggh]h l_jfhmgZoZ \uah\ kbkl_fguo dhfZg^ ba ijbeh`
e_gbykl\bfhc b Zmbjgh\Zgb_ kbkl_fguo kh[ulbc
^ =eZ18Z MijZ\e_ghbe_vah\Zl_evnkb_^fhbfe_gbyfb
< wlhc]eZ_ hibku\Z_lky bkihevah\Zgb_ f_g_^`_jZ
ijbeh`_gbc hkms_kl\eyxsbo bgl_jZdlb\gh_ \aZbfh^_
fh[bevgh]h mkkZ

^ =eZ\Z Kha^Zgbc ihevah\Zl_evkdbo hih_s_gbc
< ^Zgghc]eZ_ jZkkfZljb\Z_lky bkihevah\Zgb_ fkg_
gh_ wlhc kem`[u fh`gh kha^Z\Zlv jZaebqgu_ ieZ\gb
a_ju[m^bevgbldZbcf_jb ^jm]ibb_eh`_gby ^eys_gby_ihevah\
\ aZ^Zggu_ fhf_glu \j_f_gb
^ =eZ\Z ;mn_j h[f_gPZ^ey jZ[hlu k l_dklhf
=eZ\Z ihk\ys_gZ bkihevah\Zgbx f_g_^`_jZ kbklijbgh
eh`_gbyo ^ey dhibjh\Zgby b \klZ\db l_dklZTextZTolZ
Speech² [b[ehb_b ^ey kbgl_aZ j_qb gZ hkgh_ l_dklZ

Bkoh^gu_ dh^u ijbf_jh\

Ih kkuefb http://85.249.45.166/9785977506663.zip fh`gh kdZqZlv Zjob k bkoh^gufb dh^Zfb ijbf_jh\ ijbb[1] ^Mdklzgh\dZ ijbf_Zjh gZ ijbeh`_gbysk_ ijbf_ju bkihevam xlZ evmgdkb $6Q.G\Uj R L kbb beb gb dhfb bebjh\Zgu \ kj_^_ (FOLSVH

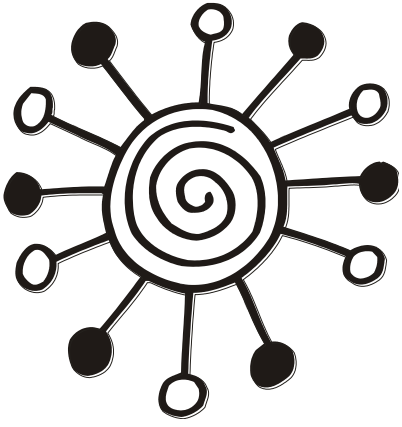
Dgb]Z kh^_j`bl ihegu_ bkoh^gu_ dhh^u_ xsb okyjhgZZf^ h^gZdh g_dhlhju_ ihkZbfgby wdhghfbb f_klZ b \h ba[ gh]h ^mh\Zgby bgnhjfZpbjbZ kh^ihevdh baf_g_gby ijh]jZ hlghkbl_evgh ij_^u^msbo ebklbg]h\ LZdh_ khdjZsh_g ghfblv f_\kdhgb]gh b memqrblv ihgbfZgb_ ijh]jZffgh]h lhevdh gZ gh\hc nmhkdbcbZ gZ^Zhekvdg_ lZd`_ gZcehu^yjlkymjk bkihevam_fu_ \ ijbf_jZo ijbeh`_gbdgbjb_^_gguo \

<k_ ijbf_ju ijbeh`_gbc k^_eZgu ih \hafh`ghklb dhf dhgdjg_mx nmgdpbhgZevghklv jZkkfZljb\Z_fmx \ ^Zgg \u ijhqblZ_l_ dgb]m \u fh`_lv_dhk^ihjbvfahZ dZd kijgZ\ nhjfZpbx b j_kmjk ijb kha^Zgbb kh[kl\_gAgdrodijbeh`_jug ijbeh`_gbc gZ ^bdkmdjbjkhjZngu ih l_fZf b iha\heyxl ijb e_]dh hlukdZlv j_ZebaZpbx gm`ghc \Zf nmgdpbhgZev

;eZ]h^Zjghklb

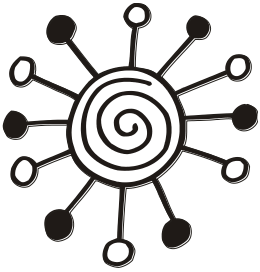
<i_j\mx hq_j_^v ohqm ih[eZ]h^Zjblv k\hbo jh^guo fhjZevgmx ih^^_jihqmk\k_ gZibkZgby dgb]b Z lZd`ba \ ^Zl_evkl;\Z<l_l_j[mj] dhlhjuZ]ebfg_k\ha^Zgbb b [_a dhlhjuo wlZ dgb]Z g_ mhb^g_eZh[ZekZ\[u \ jmdb qblZl_e

[1] KkuedZ ^hklmigZ lZd`_ kh kljZgbvwwwbdvgu.]b gZ kZcl_



Q : K L Y V

H ; S B ? K < ? > ? G B Y



=eZ\Z

lh^dexq_gb_ fh[bevgh]h mkljhckl\Zey l_klbjh\Zgby b hleZ^db ijbeh`_gbc

lj_`^_ q_f fu ijbklmibf d jZajZ[hld_ ijbeh`_gbc ij dgb]_ y [u ohl_e h[jZlblv \Zr_ \gbfZgb_ gZ bgkljZnf [hldb ijbeh`_gbc Android. ^< wlhc]eZ_ hlbkugZkljhcdZdex q_gb_ fh[bevgh]h Android ^eyZ l_klbjh\Zgby bijbehZ^gb dhlhju_ fu [m^_f jZajZ[Zlu\Zlv \ ijhp_kk_ jZ[hlu k dg

Kj_^Z jZajZ[hldb b SDK

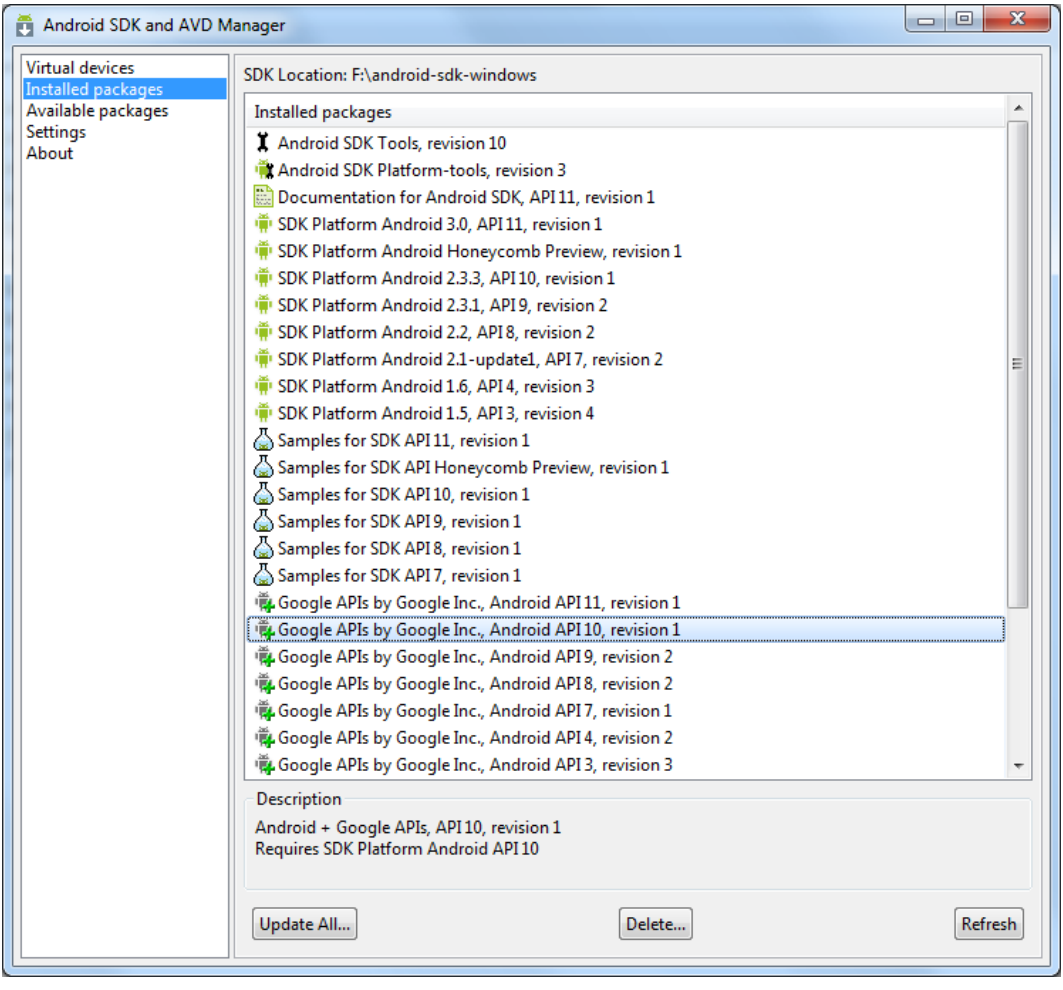
lhkdhevdm \u m`_ gZ\_jgydZ[hldb jZajZ[hldb b Android, gZ \Zr_f jZ[hq_f dhfivxl_j_ ^he`gu [ulv mklZgh\emg f_glu >ey jZ[hlu gZf ihgZ^h[ylky ihke_^gyy Eclipse (gZ fhf_gl gZibkZgb] b Eclipse Helios 3.6.2) b ieZ]b ADT (Android Developer Tools) ^ey g<_jkbyZ]ihgZ ADT ² 10.0.1 beb \ur_ _keb d fhf_glr [m^_l_ qblZlv wlm dgb^]mxs\Zy ^_l ke

LZd`_ ^ey jZ[hlu k dgb]hc m \Zk ^he`gu [ulv mklZg SDK _jkb 2.3.3 (API Level 10) <_jkb Android SDK 3.0 (API Level 11) g_ hZya l_evgh ^he`gZ ijbkmlkl\h\Zlv \ \Zr_c bgklZeeypbb l ih jb\Zlv kha^Zgb_ ijbeh`_gbc lhevdAndroid ^ey ZkfZ]hlZhgh\ Z gufbPC ² wlh_fZ ^ey ^jmb]bc dg

?keb \u ^Z\gh g_ h[gh\eyeb k Android SDK Zeijyb bjxl_Z m gh\e_ggu_ m \Zk [b[ebhl_db g_ \ SDK Manager hldZ_lZeh]_]^_ m \ Z e_g Android SDK, b \ hdg Android SDK and AVD Manager hldjhcl_ m Installed Packages GZ ijZ\hc iZg_eb hlh[jZaylky mklZgh\e_ aZgh gZ 1.1 ibk

Djhf Android SDK _jkb 2.3.3 gZf ihgZ^h[ylky [b[ebhl_db Google API ^ey jZ[hlu k k_l_\ufb kZ\ Google API Wb [b[ebhl_db g_ \ Android \ SDK b mklZegZZxlky hl^_evgh M \Zk ^he`gu [ulv bgklZ ^h Google API Level 10 \dexqbvgb jb.k).

?keb m \Zk g_ mklZgh\e_gu lj_[m_fu_ [b[ebhl_db h ihgZh[ylky gZf ^ey jZ[hlu k ijbf_jZfb ijbeh`_gb^m kabv rZ] dhlu c g_h[oh^bfh k^a_ZgZlvky gZkljhcdhc fh[bevgh]



J b k 1. M k l Z g h \ e _ g g u _ A n d r o i d S D K b G o o g l e A P I

G Z k l j h c d Z f h [b e v g h] h l Z e _ n h g ^ e y h l e Z ^ d b i j b e h ` _ g b c

W f m e y h j h \ Z g b y i j b e h ` _ g b c i h k \ y s _ g g m x [ Z a h \ u f i j b g p b i Z f i h a g Z d h f b e b k v k n m g d p b h g Z e v g h k l v x i j _ ^ h k l Z \ e y _ l r b j h d b _ \ h a f h ` g h k l b ^ e y m k l j h c k l Z \ Z _ f u _ \ d [b] _ k e m ` [ u i j b e h ` _ g b y k] j Z n b q _ k d b f b g l ` _ g b y ^ e y j Z [h Z u Z k b ^ Z g g u o] j Z n b d h c b ² f i n a v h e f x b k i h e v a h \ Z l v w h e y ^ e j y h l e Z ^ d b b l _ k l b j h \ Z g b y

Android ij_^hklZ\ey_l rbjhdb_ \hafh`ghklb ^ey jh\Zgby ijbeh`_gbc L_ qblZl_eb dlh m`_ bamqb[b, f ihk\ys_ggmx [Zah\uf ijbgpbiZf ijh]jZffbjh\Zgby Android gZmie ihagZdhfbebkv k nmgdpbhgZevghklvx ij_^hklZ\ey_l h mkljhck Android. IjZdlbq_kdb \k_ ijbeh`_gby ^ey jZ[hZu Zk b ^Zgguo]jZnbdhc b² f i n a v h e f x bkihevah\Zlv w h e y ^ e j y h l e Z ^ d b b l _ k l b j h \ Z g b y

H^gZdh ijb jZajZ[hld_ dhff_jq_kdh]h ijbeh`_gby ^e Android g_h[oh^bfh ijh\_jblv k\h_ ijbeh`_gb_ gZ j_Zev q_f i_j_^Z\Zlv _]h ihevah\Zl_eyf Djhf_ lh]h g_h[oh^ ijbeh`_gby fh`gh hleZ^blv gZ Android wfmeyl mjkeh\gh \ w Android bf__lky fgh`_kl\h \hafh`ghkl_c h^gZdh g_dhlh lj_[m_lky hleZ`b\Zlv bvll_kebvjh\ZgZ j_Zevghf mkljhck aZimkdZlv ijbeh`_gby jZ[Wi-Fi, Bluetooth, ihkihevamxsb_ \klj \ fh[bevguc l_e_nhg k_gkhju ^ey baf_j_gby l_fi_jZlm mjh\gy aZjy^db [ZlZj_b Z lZd`_ \kljh_hgomxbfh^l_hevZ j_Zevghf fh[bevghf mkljhckl_

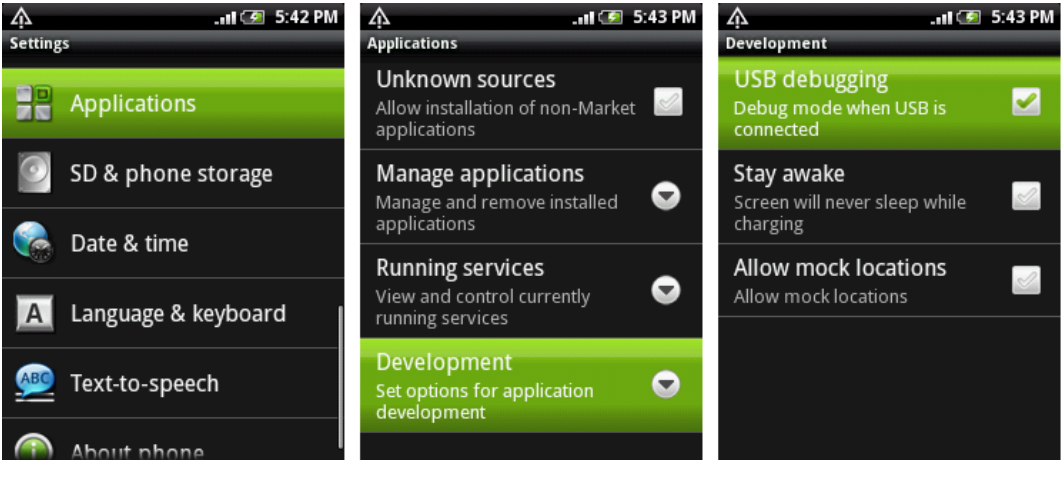
GZ j_Zevghf fh[bevghf mkljhckl\h l_klbjh\Zlv b hle kha^Z\Z_fu_ ijbeh`_gby dZ Zdb gZ wfmeylhje_y SDK kdhgnb]mjbjh\Zlv fh[bevgh_ mkljhckl\h ^ey bogkhZeZ ijbeh`_gb_c h[oh^bfh \uihegblv g_kdhevdh rZ]h\

- MklZgh\blv gZ fh[bevghf l_e_nhg_ USB bf hleZ^db q_
- MklZgh\blv gZ j_`bfZ hleZ^db USB \Zr_]h fh[bevgh]h mkljhckl\Z _keb \u ^\hbkbo ihj _]
- Ijh_jblv jZ[hlhkihkh[ghklv kh_^bg_gby jmk_gb DVMS (Dalvik Debug Monitor Server).

MklZgh\dZ j_`bfZ hleZ^db USB

GZfh[bevghf l_e_nhg_ Settings ijbh[uqgh wlZ hipby \u\l ^hfZrg_f wdZ Home Screen _keb ²g_l_ fh`gh gZclb \AfZlg_x ihke_^h\Zl_evgh Applications | Development | USB debugging bihklZ\vl neZ`b Debug mode when USB is connected dZd ihdZajZk.2. gZ

Ihkel_h]h dZd \u \uihegbeb wlb ^_ckl\by ih^dexqb l_ nhg d dhfivxl_jm bkiheVsb USB myd dZh[j_ucv dZd ijZ\beh \ dhfie_dlh[kev fguf l_e_nhghf



Jbk 2. <dexq_gb_ j_USB fh[bevghf_lhe_ USB debugging gZ fh[bevghf_lhe_

M k l Z g h \ d Z ^ j Z c \ _ j u S B j Z

Q l h [u k h _ ^ b g b l v f h [b e v g u c l _ e _ n h g k \ Z r b f d h f i v Z x l g h \ e _ g Z k j _ ^ Z j Z a j Z [h l d b i h l j _ [m S B - k y Z b g k j l Z e k y h f b y k l k f h ^ _ e v x \ Z r _] h g Z _ e A ^ n _ k v \ h a f h ` g u ^ \ Z \ Z j b Z g l Z

‰ b k i h e v a h \ Z l v ^ j Z B c \ i h j k u l Z \ e y _ f u _ \ A n d r o i d S D K;

‰ b k i h e v a h \ Z l v ^ j Z B c \ i j j _ ^ h k l Z \ e y _ f u c i j h b a \ h ^ b l _ e _ f ^

f h [b e v g h] h l _ e _ n h g Z

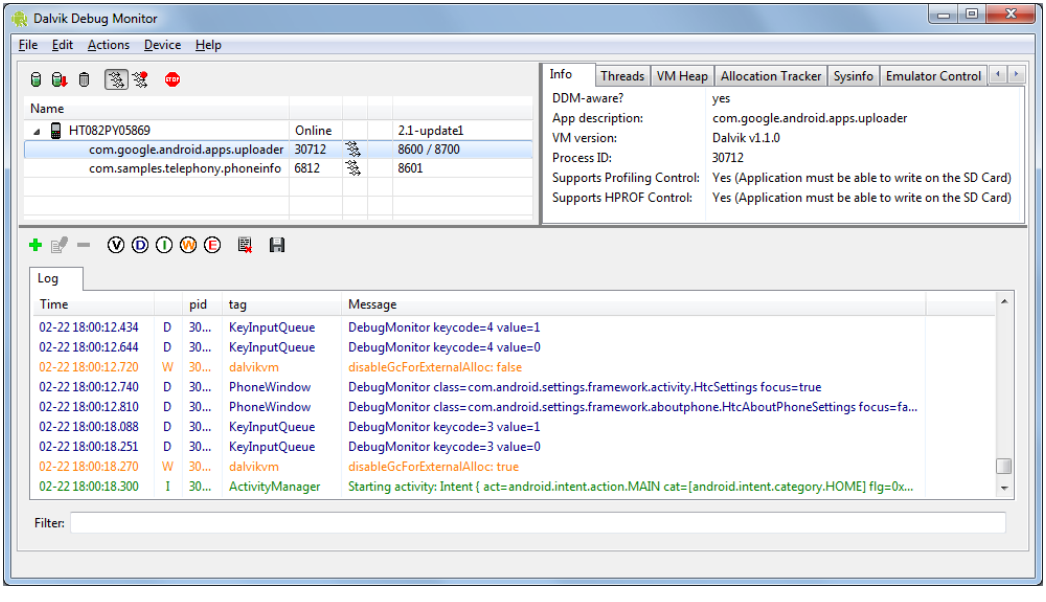
> j Z c \ _ j u S B ^ e y W i n d o w s ^ h k l m i _ g ^ e y a Z] j m a d b d Z d ^ h l n h e g _ g A n d r o i d S D K > j Z c \ _ j u S B ^ e y f h [b e v g h] h , i l e k l n Z h e y Z _ f u _ \ f k A n d r o i d S D K j Z k i h e h ` _ g u \ a n d r o i d - s d k - w i n d o w s \ g o o g l e - u s b _ d r i v e r.

H ^ g Z d h w l b ^ j Z c \ _ j u j Z k k q b l Z g u l h e v d h g Z g _ k h g h e v i h w l h f m e m q r _ \ u [j Z l v \ l h j h c \ Z j b Z g l b b g k U S B Z e i e j b ^ h \ Z l Z e y _ f u c i h b a \ h ^ b l _ e _ f \ Z r _] h f h [b e v g h] h l _ e _ n h g Z ^ b l H e u i j _ ^ e Z] Z x l h l ^ _ e v g u _ ^ j Z c \ _ j u b e b i Z d _ l u ^ e y k b g o c h g k l \ Z b d h f i v x l _ j Z \ d h f i e _ d l d h l h j u o U S B. _ \ o h ^ b l ^ j Z c \ _

I j h p _ k k m k l Z g h \ d b U S B j Z c \ _ g Z i j h k l h c _ [m ^ y m g _] h a ^ l k v j b \ Z l v Z \ _ g j g y d Z \ u \ k _ m f _ _ l _ w l h ^ _ e Z l v

< a Z b f h ^ _ c k l _ f h [b e v g h] h l _ e _ n h g Z b k

I h k e _ i h ^ d e x q _ g b y l _ e _ n h g Z b m U S B Z g h h [b e v g h] h ^ j Z c \ _ j u Z \ \ a Z b f _ c k l \ b _ f h [b e v g h] h m k l j h c k l \ Z b b g k l j m f _ g l ' D a O h L ^ Z b Z H Z i j b e h ` _ g b c > e y w l h] h a Z i m k l b l _ b g k l j m f _ g l ' D a O h L ^ Z b Z H Z tools \ d Z l Z e h] _ m k l Z g h A n d r o i d S D K _ j h e b g Z i j y f n D E E c l i p s e \ u [j Z \ i j _ ^ k l Z \ e D e v i c e s i m g d l f W i n d o w | S h o w V i e w | O t h e r | A n d r o i d | D e v i c e s).



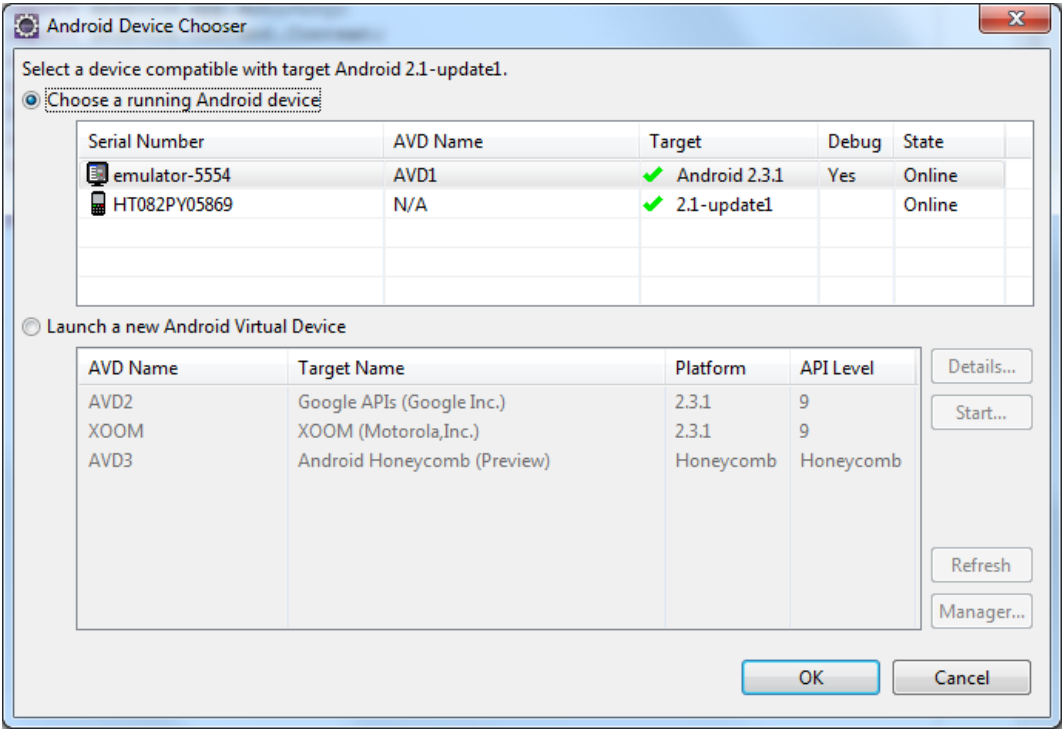
J b k 3. I h ^ d e x q _ g b _ f h [b e v g h] h m k l j h c k l \ Z d D D M S

?keb \k_ [ueh ijZ\bevgh mklZgh\e_gZ iZgZ \h dZ\Zgh gZ Name [m^_l hlh[jZ`Zlvky ih^dexq_ggh_ \gklrjh\k Zaiz\gh gZ 1.3 jbk

Bgkljmf_gh DDMS jZ[hlZ_l k j_Zevguf fh[bevguf mkljhck b k wfmeylhj g_ aZimkd b bgklZeeypby ijh_dlZ gZ fh[bevguc l_e_nlhf Android <u fh`_l_ ihemqZlv bgnhjfZpbx h kaZ kZo kbkl_fguo kh[ulbyo bf__l_ ^hklmi d nZceh\hc nmgdpbyf ij_^hkulZ\vky bgklZeeypby bgkljmf_glhf

AZimkd b bgklZeeypby ijh_dlZ gZ fh[bevguc l_e_nlhf DDMS Eclipse

L_i_jv fh[bevgh_ mkljhckl\h mki_rgh ih^dexq_gh- d lipse fh`gh \u[bjZlv f_klh jZa\_jlu\Zgby \Z:rwjh eylhj` Android g beb fh[bevgh_ mkljhckl\h ljb aZimkd_ ijh_dlZ gZ h\u \h_hdgh Android Device Chooser, dhlhjhh_a\hey_l \ufjZ\lh^ey jZau_j \Zgby ijbeh`_jgky ijb mkehq\lhbm \Zk aZims_g Android.m ?keb wfmeylhj g_ aZims_g hdgh \u[hjZ mkljhckl\Zag _jg_lky kjZam gZ fh[bevgh_ mkl\hf mk



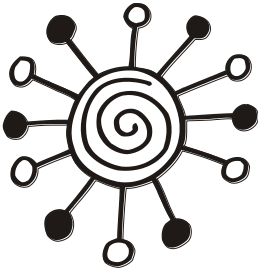
Jbk 4. <u[hj p_e_\h]h mkljhckl\Z ^ey bgklZeeypbb b aZimkdZ

J _ a x f _

< w l h c] e Z \ _ f u j Z k k f h l j _ e b i h ^ d e x q _ g b _ b g Z k l j h c g Z i e Z h j f _ Android ^ e y l _ k l b j h \ Z g b y b h l e Z ^ d b i j b e h `_ g b c j Z [h l u k i j b f _ j Z f b i j _ ^ h k l Z \ e _ g g u f b \ d g b] _ H ^ g Z Z h e b q b b _ h e g Android g j Z k k l j Z b \ Z c l _ k v F g h] b _ i j b f _ j u i j b e d g b] _ i h a \ h e y x l h [h c l b k v Android w r o i d e y l h j h f

G h g _ h [o h ^ b f h m q b l u \ Z l v q l h ^ e y j Z a j Z [h l d b i j b e h _ ^ b g _ y b y W h y ( ] e Z 1 Z \ k l j h _ g g m x \ b ^ _ h e Z 1 2 j n Z i i Z j Z l g u _ ^ Z ( ] e Z 1 3 ^ h k l m i d Z d d m f m e y l h j e Z 1 5 j n Z i i Z j Z l g u _ w b y e _ g b _] e Z 1 6 [_ a f h [b e v g h] h Android e _ g b _ g h g l Z [h c l b k v

< k e _ ^ m x s _ c] e Z \ _ [m ^ m l j Z k k f h l j _ g u [Z a h \ u _ i j b g k _ l _ \ u o k e m `[  k b k l _ f g u o  d h f i h g _ g l h \ d h g k l Z y ^ g Z Z k g j h c d  g b o  [ Z a  ^ Z g g u o  Z  l Z d `_ m k l Z g h \ d Z l j _ [m _ f u o j Z a h _ r `_ g b y f ^ h k l m i Z d k b k l _ f g u f Android d h f i h g k g l Z \ f u f d h f f h y g b d Z p



=eZ\Z

>hklmi d kbkl_fguf dhfihg_g b k_l_\uf k_j\bkZf

Ij_`^_ q_f fu i_j_c^_f g_ihkj_^kl_ggh d kha^Zgbhx \Zgb_f nmgdpbhgZevghkl_c ij_^hklZ\ey_fuo kAnkroidfg bf__l kfuke k^_eZlv g_[hevrhc h[ahhj\wbbb[kdrhfihlg g_ [Zah\u_gpjbiu jZ[hlu k gbfb

< wlhc]eZ_ hibku\Zxlky h[sb_ ijbgpbiu hj]Zgbag_Zp lhAndroid b ^hklmiZ d gbf ijbeh`_gbc

Dhfihg_glu kbklAndroid

L_ ba qblZl_e_c dlh m`_ bamqZe kZfhkkhyfAnrdroid,h ^he`gu [ulv agZdhfu k [Zah\ufhAndroidihB o g\kZ_fhhj:

- Activity;
- Service;
- Broadcast Receiver;
- Content Provider.

Bafh_c dg[b]]bu m`_ magZeb ijbgpbiu jZ[hlu k dhfihg kljhblv ijbeh`_gby k]jZnbq_kdbf bgl_jn_ckhf khag^Z gu_ kem`[u jZ[hlZlv k [ZaZfb AndroidZdgogu²o wKhbkfg_hf]Zhnhmg gZevgZy ieZlnhljjfbZ g\g mm`_ j_Zebah\Zgu fgh]hqbke_ dhlhju_ fh`gh bkihevah\Zlv \ \Zrbo ijbeh`_gbyo lhw kl_gguo ijbeh`_gbc gbfhkglbhaZlv\h bah[j_lZlv \_ehkb \hafh`ghklb bkihevah\Zlv nmgdpbhgZevgdhkfihgk_mgsh\klk fuAndroid.

G_klhbl lZd`_ aZ[u\Zlv b lhl nZdl qlh fh[bevguc l_ hq_j_^v kj_^kl\hf dhffmgbdZpbb b h[eZ^Z_l ihfbfh Z[hg_glZfb khlh\hc k_lb _s_ b ^hkWhhhhadgZgZ_jgbohh ijbeh`_gbyo fh`gh bkihevah\Zlv jZaebqgu_ m^Ze_kgu lZ\ey_fGoogle gZbfj_jGoogleMaps, StreetView b ^j

Kbkl_fgukem`[u

IeZlnhjfAndroid ij_^hklZ\ey_l \ \Zr_ jZkihjy`_gb_ fg nmgdpbhgZevghklv dhlhjbkihevah\Zlv \ jZajZ[Zlu\Z__f gbyo Dhlhqkekm`[k \uoh^hf dZ`^hc gh\hc \_jkbb ihkl b gZ fhf_gl \ujkh^bZ \bo m`_ fhe__

F u d j Z l d h j Z k k f h l j b f ^ h k l m i g A n d r o i d k e k m l ` [f u _ b b o i j _ ^ g
g b _ q l h [u \ u i f h e] m e q b l v i h e g h _ i j _ ^ k l Z \ e _ g b _ h \ h a f h
^ y s b o \ k h k l Z \ i e Z h n d m d j f u

F h [b e v g u c l _ A n d r o i d g i j _ ^ h k l Z \ e y _ l i h e v a h \ Z l _ e c x b d j Z
] j Z n b k d b c b g l _ j n _ c k > e y _] h i h ^ ^ _ j ` d b \ k b k l _ f _ k n
^ e y m i j Z \ e _ g b y _ k j d Z b f b i h e v a h \ Z l _ e v k d b f b g l _ j n _ c k h f

- Wallpaper Service² k e m ` [Z ^ e y m i j Z \ e _ g b y h [h y f b H a n Z e j n
  Screen ^ h f Z r g b c w d j Z g f h n [k e j v h c k] l h Z
- Layout Inflater Service² k e m ` [^ Z e y m i j Z e _ g b y h f i h g h \ d h c h d h g b i j b
  g Z f b q _ k d h c a Z] j m a d _
- UI Mode Service² k e m ` [i Z _ ^ g Z a g Z q _ e y m i j Z \ e _ g b y b f Z f b j Z [h
  i h e v a h \ Z l _ e v k d b f h] j n _ c k Z

  > e y h j] Z g b a Z p b b \ a Z b f h ^ _ c k l \ b y i h e v a h \ Z l _ e y k h f h
k l Z i e l Z h j f u A n d r o i d \ d e x q _ g u k e m ` [u d h l h j u _ h [_ k i _ q b \
b m i j Z \ e _ g b _ i h e v a h \ Z l _ : e v k d b f \ \ h ^ h f

- Input Method Service² k e m ` [Z b k i h e v a m _ f Z y ^ e y l _ d k l h \ h] l
  h [_ k i _ q b \ Z _ l h l h [j Z ` _ g b _ Z \ l h b ^ h \ i \ h e ^ g _ g b y k l Z i h e v a
  \ l _ d k l h \ h . G l Z i e j b f _ j w l Z k e m ` [Z j Z [h l Z h ^ l b l d h l] ^ S Z K S \ u
  k h h [s _ ; g b y
- Accessibility Service² h [_ k i _ q b \ Z _ l ^ h k l m i d k h [u l b y f \ h v a g
  a h \ Z l _ e v k d h f b g l _ j n _ c k i j b g Z i j Z b f b j i h e v a h \ Z l _ e _ f h g
  e m q _ g b x h b e j b i n h d m k Z \ ; b ^ ` _ l h f
- Clipboard Service² m i j Z \ e y [m l n _ j h f [f _ g Z m n _ h j [f _ g \ Z A n d r o i d , \ h l
  e b q b h l ^ j m] b k o b k l , _ f h ` _ l b k i h e v a h \ Z l v k y l h e v d h ^ e y l _
  ] e h [Z g e u v f l \ b ^ _ g ^ e y \ k _ c k b k l _ f u Z g _ ^ e y b y l ^ _ e
- Search Service² k e m ` [^ Z e y m i j Z \ e _ g b y n m g d p b y f b] e h [Z e v l g h
  j h c k l ; \ _
- Keyguard Service² k e m ` [Z ^ e y m i j Z \ e _ g b y [e h Z l b m j h u d f h d [b d e e
  ] h m j k c k l . \ Z

  < Z ` g m x j h e v \ i e Z h n d m d f b ] j Z _ l ] j m i i Z k b k l _ f g u o k e Z n `
q _ g g u o ^ e y h j] Z g b a Z p b b \ a Z b f h ^ _ c k l \ b y d h f i h g _ g l h
b i j b e h ` _ g b c \ _ ^ _ g b y ` m j g Z e Z k b k l _ f g u o k h [u l b c b
h k h [u y l d o i j h b k o h ^ y s k b _ o f : _ \ k b

- Notification Service² m i j Z \ e y i h e v a h \ Z l _ e v k _ c b f f e _ g b y f b g Z i j
  i j b i h e m q S Y S b k h h [s _ g b y d h l h j u _ h l h [j Z ` Z x l k y \ k h l j l
  [b e v g h] h m k l ; j h c k l \ Z
- Alarm Service² i j _ ^ g Z a g Z q _ g Z ^ e y h l i j Z \ e _ g b y i h e v a h _ \ Z
  j b h ^ b q _ k d b o h i h \ _ s _ g b c \ a Z ^ Z g g h _ \ j _ f y \ \ b ^ b f _ _ j a \
  [m ^ b e v g b d _ l h e \ b o k \ k b] g Z e h \ \ b [j h a \ h g d Z l _ k l h \ u o k
- Window Service² k e m ` [Z y ^ ^ h k l m i Z d k b k l _ ^ f g _ j f m h f d _ g g _
- Activity Service² k e m ` [^ Z e y a Z b f h ^ _ c k l h b t y _ d l Z A c t i v i t y , h l d j u l u f b
  \ ^ Z g g u c f h f _ g l \ j _ f _ g b \ k b k l _ f _ A c t i v i t y S e r v i c e k e h m ` [Z
  \ a Z b f h ^ _ c k l \ h g \ Z l l h e A c t i v i t y k g h b k ^ j m] b f b k e m ` [Z f b
  k y \ k k b f _

^ Dropbox Service² ij_^gZagZ^qe_ygZ_ki_q_gby aZibkb kbkl_f
\ ^bZ]ghklbq_kdbc nZce
>ey mijZ\e_gby aZ^lbZb \hjkhiba_^_fgbmaudb ^b_hb]jhfd
klvx j_`bfZfb l_e_nhggu ogaZ\hieZhhAndroid ij_^mkfhlj_
kem`[AudioService.
>ey jZ[hlu k h[hjm^h\Zgb_f AndroidelZlh`hjfkms_kl\m_
kem`[dhlhju_ h[_ki_qb\"Zxe_^"afhl[mievdghjeh_mhgZ b bhkil
\Zgb_ _]hbe\hijgbyo
^ PowerService² kem`[^Zey mijZ\e_gby wg_j]hihlj_[e_gb_f^ W
gZagZq_gZ \ i_j\mx hq_j_^v ^ey wnn_dlb\gh]h bki
[bevghf mkljhckl\h_a\hHegyZ ijZ\eywg_j]hihlj_[e_gb_f kkhjZ
ih^k_ldwhcjZbgZdeZ\bZlmju _keb lZdh\Zy bf,__lky gZ
^ Battery Manager² kem`[^Zey dhgljhey khklhymgybyhjZbdmfZlZ
WlZ kem`[Z ihemqZ_l ^Zggu_ h kl_i_gb aZjy^Zh[xdleZ
q_gbb aZjy^gh]h mkljhckl\Z b ^jm]mx \Z`gmx bgZh
gby fh[bevgmkljhckl\Z
^ Sensor Service² kem`[Z ^ey ^hklmiZ d \kljh_gguf ^Zlqbdz
jhf_ljm ^Zlqbdm l_fi_jZlmju hk_sjhmgkhklhZfh[bevg
^ Storage Service² kem`[Z ^ey mijZ\e_gby b_f ^Zgngzuceh\hkc
l_f:_\h \gmlj_gg_c iZfylb mkljhckl\Z b gZbkt_fghc dZ
^ Vibrator Service² kem`,[hZ[_ki_qb\Zx^sZ\ybimZj\e_g\b[jhagdhhf
fh[bevghm]hckl\Z
Ihkdhevdm hkgh\guf gZagZq_gb_f fh[bevgh]h mkljh
dhffmgbdZpbb Android_fZkiheZ]Z_l [hevrbf dheemq`[kl\e
mijZ\e_gby\ufb kh_^bg_gbyfb b i_j:^Zq_c ^Zgguo
^ Telephony Service² kem`[^Zey mijZ\e_gbey_nhggufbgdpbyfbve
gh]hmkljhckl\Z WlZ kem`[Z mijZ\ey_f l_e_nhggufb
b ijb_fSMS-khh[gb;c
^ Connectivity Service² kem`[^Zey mijZ\e_gby\ufbkh_^bg_gbyfbv fl
gh]h l_e_nhgZ
^ Download Service² kem`[^Zey mijZ\e_gZ ijmad^Zfbguo dHTTP;a
^ Wifi Service² kem`[Z ^ey mijZ\e_gby k_glb_WiFi kh_^bg
^ Location Service² kem`[Z ^ey hlke_`b\Zgby nbabq_kdbo
eh`_gby fh[bevgh]h mkljhckl\Z WlZ kem`[Z bkihev
eh`_gby b k_l_\uGoogle\bku
^ NFC Service² kem`[^Zey mijZ\e_gby NFC (Near Field Communication). Wh
l_ogheh]by [_kijh\h^ghc \ukhdhqZklhlghc k\yabihZe
a\heyxsZy ijhbakh_^bvg_gb_ b^Zhgfugb f_`^m mkljhZk
oh^ysbfbky gZ jZkgklhdyhevdZbgl_ljh\ WlZ gh\Zy l_
ij_^gZagZq_gfhZ\yeyuo l_geh_bhieZl_`guo kbkl_f
< fh[bevghf mkljhckl\Zd`_ ij_^mkfhlj_gemZ[h^jeky\mi
e_gby [_ahiZkgmhgkuf b aZibkyfb b iheblbdZfb [_ahiZkg
^ Account Service² bkihevam_lky ^ey mijZ\e_gby ihevah\Z
aZibkyfb ij_^gZagZq_ggufb ^ey ^hklmiZk_j\bZkZ\bd
ijbf_fGmail, Facebook b ^j

^ Device policy Service² ij_^gZagZ^eyZ^fbgbkljbjh\Zmkbjhckl
bmijZ\e_ghbeyvah\Zl_evikebfbdZ[fahiZkghkZlijbf,_mklZgZ
eb\Zfbgbfzgemx^ebgiZjhey \j_fy ^_ckl\by iZjhey b ^j
>ey ^hklmiZ d kem`[Zf \ ijbehd`SDkbykih\evamxlky f_g
kem`[ M dZ`^hc kem`[u aZ j_^dbf bkdexq_gb_f _
LZ,dgZijbf,_j^eymijZ\e_gkbeym`[hPower Service bkihevamPower
Manager, ^eTelephonyService² TelephonyManagerbl. ^:
Ih^jh[gh \k_ kem`[u iZdbdhfujZkkfhlj_lv g_ fh`_]f \
jZgbq_hghgh[t_fZ dgb]b gh ijbf_g_gbx [hevrbgkl\Z ba
dhlhju_h]fml gZb[he__ qZklh bkihevah\Zlvky \ ijbeZ`_
lhqgh \gbfZgb^ymxskbeo]eZ\Zo

H[t_dlIntent

Ihfbfh kem`[i_j_qbke_gguo \ ij_^u^ms_f jZa^_e_
kl\m_lh`fgkl\h klZg^Zjlguo $FWLYLW\ dhlhju_bakuhf]h
ijbeh`_gbbykihevamy Intent_dlWlb h[t_dlkbkl_f_ $QGURL
kj_^kl\hf ^eyg_jha k\yau\Zgby \h \j_fy \uiheg_gby f_
h^gh]h beb g_kdhenv`dbocij
<k_ h[t_dehu fh`gh jZa^_eblv gZh^jb_dZ
^ Activity Action Intent² bkihevakmy ^ey \uah\Z $FWLYLW\ mgZ
]hf ijbeh`_gbby \uah\Z Z[hg_glZ b hl_lZ gZ \oh^y
\ua\Zlv khhl_lkl\mxsbf Activity bc ?keb gZf lj_[m_lky \dexq
kh_^bg_gb_ fh`gh k^_eZlv we_f_gl mijZ\e_gby
\dexq_gby kh_^bg_gby \ ijbeh`_gbb beb \ua\Zlv
Activity dhlhjuc ij_^hklZ\ey_l jZaghh[jZagu_ hipbb
dhgnb]mjbjh\Zgby k_l_\h]h kh_^bg_gby
^ BroadcastIntent² jZkkueZxlky \k_f dhfihg_glZf gZoh^ysb
mkljhckl_ ^ey hih_s_-gby[hhkbZulhfb ijhbahr_^r_f
GZijbf_j ijb ihemq_gbb fh[bevguf mkljhckl\hf[s_g^
kbkl_ Android ihkueZ_h\h_is_gb_ %URDGFDVW ,QWHQ
fh`_l i_j_o\Zlblv b h[jZ[hlZlv Intent hl h[j_Z]bjh\Z\ g
kh[ulb_ khhl_lkl\mxsbf h[jZahf

Intent-nbevlju

G_dhlhjuih_s_gby BroadcastIntent ihkueZxlky kl_fhkc[hevrhc
qZklh,lgZijbf_j kh[ulb_ lZjcf]hZ[t_dlBroadcastIntent, dhlhju_
gZijbf_j]_g_jbjmxlky ijb baf_g_gbb mjh\gy kb]gZ
fh]ml baf_gylv qZklhlm k\hbo jZkkuehd \ aZ\bkbfhkl
g_mklhcqb\hc k\yabjuoeb_j[ufkls_gbyo fh[bevgh]h l_e
k ihevah\Zl_e_f qZklhlZ]_g_jZpbb lZdbo hih_s_gbc
ijb g_ih^\b`ghf iheh`_gbb fh[bevgh]h l_e_nhgZ
Ihwlhfm ijb bkihevah\Zg BroadcastIntent \\ ijbeh`_gbyo-`
l_evgh mkbZgZ\ nbevlju qlh[u g_ ihemqZlv hihl\j_s[mxbk

^ey jZ[hlu \Zr_]h ijbeh`_gby >ey wlh]h kms_kl\mx
h[t_dlh\ ,QWHQW)LOWHU Fu bo lZd`_ [m^_-f
oh^bfhklb ijb kha^Zgbb ijbehb]gbc \ wlhc d

Kbkl_fgu_ dhgl-ijh\Zc^_ju

>hklmi d ^Zgguf b jZ[hlZ k ^Zggufb \ ijbehb]gbc \ kl\ey_lky kqej^amxsb_ f_oZgbafu
^ [ZaZ ^Zgguo SQLite² j_eypbhggZy [ZaZ ^Zgguo dhlhjZ
ieZlnhjZ
‰ dhgl_-ijh\Zc^_ju dhfihg_glu kbkl_fu dhlhju_ ij_^hklZ
gbyf bgl_jn_ck ^ey jZ[hlu k ^Z
Dhgl-ijh\Zc^_ju khojZgyxl b \ha\jZsZxl ^Zggu_ ^-ey
jhf hgb bkihevamxlky lh kmlb kjh_g^bgbydZfbxlky`^m_ijb_ef
b [Zahc ^Zgguo

<kljh_ggu_ [Zau ^Zgguo

IeZlnhjZ ij_^hklZ\ey_l g_kdhevdh \kljh_ggu [Z
guo ^ey ijbeh`_gabc kqhl_lkl\mxsb-ijh\Zc^_ju
<ufh`_l_ ihemqblv ^hklmi d-ijh\Zc^_ju kqhlevamy hm
gZevghklv ij_^hklZ\ey_l g_kdhevdh \kljh_ggu [Z
ijh\Zc^_ju dhlhju_ \k_]^Z ijbkmlkl\mxl gZ
\bkbfh hl ijhba\h^m_eyb f
^ ContactsContract² bkihevam_lky ^ey khojZg_gby ^Zgguo
lZdlh\ \ l_e_nhg_
^ CallLog² bkihevam_elky khojZg_gby ^Zgguo
a\bdh\ijhims_gg\uah\h\ b ijh^he`bb_ehgdkZ
^ Browser² bkihevam_lky ^ey khojZg_gby bklhjbb ijhkf
^Zgguo aZdeZ^hd b ihbkdZ
^ Mediastore² bkihevam_lky ^ey khojZg_gby ^Zgguo
nZceZf b dhgefmdpbdb \b^_h b nhlh]jZnbyf
^ Settings² bkihevam_elky khojZg_gby ^Zgguo
l_e_nhgZ gZijbf_j yaudZ bgl_jn_ckZ yjdhklb wgdj
dZ dhgjZ]bb k_lb b l
^ UserDictionary² bkihevam_elky khojZg_gby ^Zgguo
lhju_ ijbf_gyxlky ^ey Z\lh^hiheg_gby ijb \\h^_ l_dk
DZ`^hfm ba i_j_qbke_gjh\Zc^_jlh\gl\ kl\m_l h^ghbf_ggZgu[ZaZ ^Z
Kms_kl\m_l lZd`_ [ZaZ ^Zgguo SMS-kehh[sjZgb_ogbyhlbZjh
qbg_hd^mf_glZpby ih [ZaZ ^Zgguo SMS-kehh[sjZgb_ogbyhlbZjh
Android SDK, h^gZdh fu __ jZkk]fhZ]b_fi\b bamq_gbb kihk
]jZffgh]h i_j_o\ZlZ \oh^yssbbSMS-kehh[s_gbc

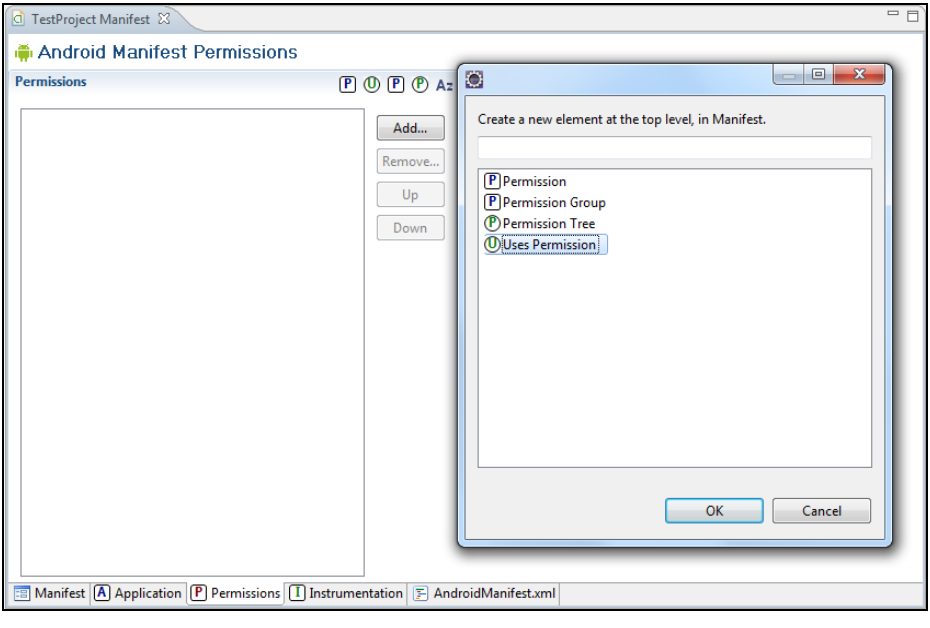
Djhf_ i_j_qbke_gguo gZ fh[bevghf l_e_nhg_ lZd`_ pbZebabjh\Zggu_ [Zau ^Zgguo ij_^gZagZq_ggu_ qey guo ijbeh`_gbc GZi-jbfZ_ma\j[ihfbfh [ZaBrowsingkidhemva _l ^hihegblx_ejZam ^ZWebviewCache^ey dwrbjh\Zgby [m bkihevam_l kh[kl_ggmxAlarmZsm ^Z

MklZgh\bjZ[m_fujZaj_r_gbc \ ijbeh`_gbb

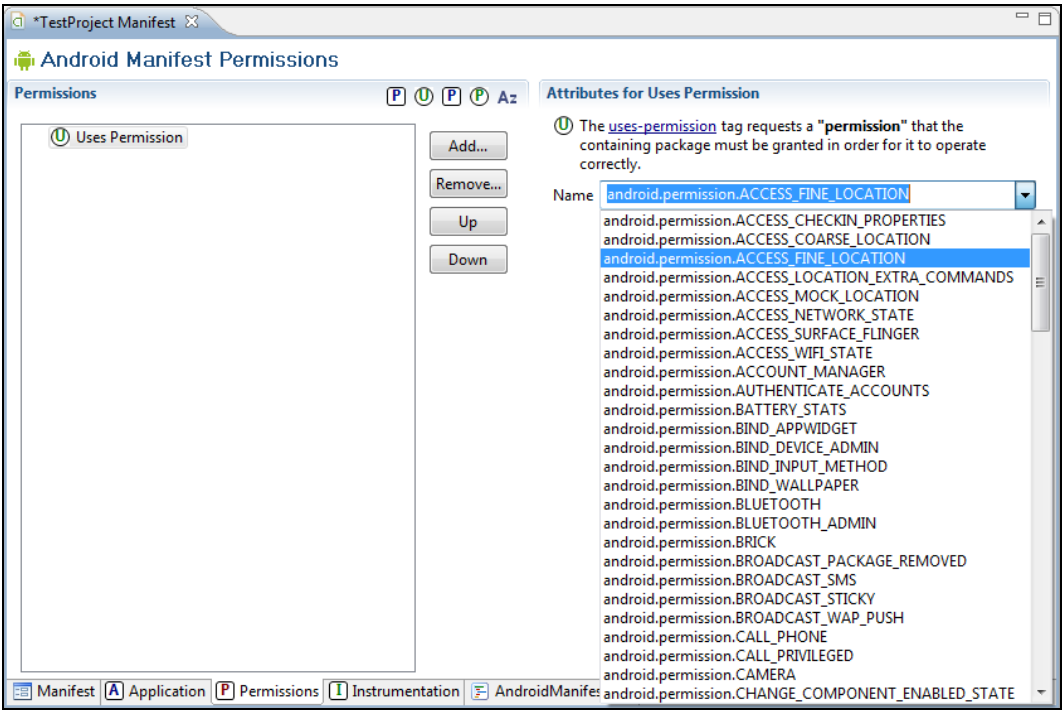
Ih mfheqZgbkl mi ihqlb dh \k_f kbkl_fguf dhfihg_gl \gr gbo ijbeh`_gbc lhwlhfm _kelj_ijmbehk`y gbkxihevah-\Z eb[h kbkl_fgmx kem`[,mg_bZjhb^fb_fjh ihkeZlv SMS[sh^xbe qblvkyhbfevghfm Bgl_jg_lm beb d m^Ze_gghfm kaZl^_Zlh ^ey ijbeh`_gby k\hmxs_blk jZaj_r_gby

Ijb kha^Zigbeh`_gbc \ wlhc dgb]_ fu [m^_f ihklhyggh jZaj_r_gby \ nZce fZgbn_klZ ijbeh`_gby >ey l_o qblZl_ ijbf_gylv jZaj_r_gby \ k\hbo ijbeh`_gbyo y djZldh jZkl

JZaj_r_gb_ fh`gh aZ^mZxlv\ gdZhi^jy fnZceZ fZgbn_klZ Zijb \b\ we_f<uses-permission> k Zljb[mlhf kh^_j`Zsbf bfy gm`g gby beb qlh [he(ihkdh^ivgh ijb j_^Zdlbjh\Zgbb nZc jZ[hlZxl \kiesbZ ih^kdZadb Z jZaj_r_gbc hqalvZfvgh^ wlh]h hdgh j_^ZelZhjZgbZ_klZ Z bf_ggh Permissions GZ^ dvmh \deZ^d_ gZ`fbl_Adgh i\dmy\b\r_^fkZyeh]h\hf hdg_ \u[_jbl User Permissions dZdZahZdgh gZ2.1.bk



Jbk 1. MklZghjZaj_r_gbc \ nZce AndroidManifest.xml



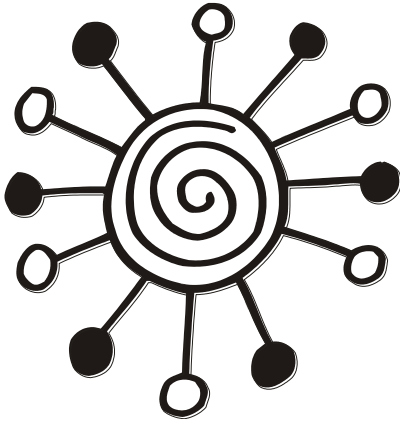
Jbk 2. <u[hj g_h[oh^bfh]h jZaj_r_gby ^ey ^hklmiZ d kbkl_fguf d

lhke_ wlh]h gZ Permissions \ ijZ\hc qZklb ihy\b Attributes for UsesPermission GZ wlhc iZg_ebZ^Zxs_kfbk Name gZoh^blk ey guc kibkhd \k_o ^hklmiguo jZaj_r_dgbhcjujbk fh`_lh \Zlv m k_[y \ ijbeh`_gbb lhke_ \u[hjZ gm`gh]h jZaj_ ^h[Z\bl _]h AndroidManifest.xml.

ijb ijh_dlbjh\Zgbb ijbie h]jZ fbklu ^h\hevgh qZklh^a dexqblv jZaj_r_gby <ijhq_f wlh kjZam h[gZjm`b\Z_ gby? ijb hlkmlkl\bdhgh mjZaj_r_gby]_g_jbjm_lky bkdexd

J_axf_

< wlhc]eZ_ [ueb jZkkfhlj_gu dh Android aZpby ^hklmiZ d kbkl_fguf Android l_\uf kem`[Zf ;he__ ^_lZebabjh\Zgguc ^hklmi d kbk ba dh^Z ijbeh`_gbc b jZ[hlZ k dhfihg_glZfb \oh^ys Android, [m^ml jZkkfZljbk Zl_v^kmx\sbo]ebZ\bZo dg



Q : K L W

; Z a h \ u _ n m g d p b
l _ e _ n h g Z
b k _ l _ c k h l h \ h c k

l h e m q _ g b _ b g n h j f Z p b b h l _ e b k _ l b k h l h \ h c k \ y a b

< w l h c] e Z \ _ l j Z k k d Z l a Z g b d Z b i h e m q b h j f Z p b b x l _ e _ n h b k _ l b k h l h \ h c b k \ y a b v a h \ Z l v _ _ \ k \ h b o k j b k e h Z d b i h a \ h e y _ l m k l Z g h \ e _ g g u f g Z h b k b e v g j b e m k j g b y f i j h b l _ e _ n h g g u _ \ u a h \ u h l i j Z \ e y S W S b k j b g s b f g b y h l k e _ `b \ Z g b _ l _ e _ n h g Z b k _ l b k h l h \ h c h l k \ y a b u c g Z [ h j k j _ ^ k l \ l _ e _ n h g h f \ u f h `_ l _ b k i h e v a h \ Z l v i j b j Z a j Z [h l d _ k h [k l

B g n h j f Z p b y h l n _ h e g _ _

> e y ^ h k l m i Z d b g n h j f Z p b b h l k h e h \ h c g k b y a b e v a m _ l k y

TelephonyManager d h l h j u c g Z o h ^ b l k y a n d r o i d . t e l e p h o n y _ . W l h d e i Z k k a \ h e y _ l i j b e h ` i g b m x q b l v ^ h k l m i d k b k l _ f g h c k e m ` [n h f g h g Z m k c k j l h _

W d a _ f i e y j w l h] h d e Z k k Z g _ k h a ^ Z _ l k y g Z i j y f m x \ d i j a _ f i e y j e Z g _ h [o h ^ b f h \ u a \ Z d w f l h ^

```
^Z\ _ f Z n Z f _ l context.TELEPHONY_S ERVICE:
TelephonyManager manage = (TelephonyMa nager) getSystemSer vice(
        Context.TELEPHONY_SERVICE);
```

D e Z k k b f _ _ l [h e v r h c g Z [h j f _ l h ^ h \ ^ e y b i Z j b k h k l h y g b y l _ e _ n h g Z l h] h k i w f l b s v x _ l h ^ h \ u f h `_ l _ i j b e h `_ g b b h i j _ ^ _ e y l v l b i b ^ h k l m i g h k l v k _ l b k h l h \ h d Z j l u b f g h] h _ ^ j m] h _ > Z e _ _ \ w l h c] e Z \ _ f u i h ^ j h [n m g p b h g Z e v g h k l b \ e y j _ f h c k l d Z e Z k k h f ^ e y m i j Z \ e _ k e m ` [ T e l e p h o n y S e r v i c e b i h m q _ g b y h l w l h c k e m ` [u g m ` g h c g Z

H i j _ ^ _ e _ g b _ l b i Z l _ e _ n h g Z b k _ l b k h l h \ h c k \ y a b

> e y h i j _ ^ _ e _ g b y l b i Z l _ e _ n h g Z b ^ h k l m i g h k l b k _ l

TelephonyManager _ k l v f _ l h ^ h \ u f h `_ l _ i j b e h ` _ g b b h i j _ ^ _ e y l v l b i b ^ h k l m i g h k l v k _ l b k h l h \ h d Z j l u b f g h] h _ ^ j m] h _ > Z e _ _ \ w l h c] e Z \ _ f u i h ^ j h [n m g p b h g Z e v g h k l b \ e y j _ f h c k l d Z e Z k k h f ^ e y m i j Z \ e _ k e m ` [ u g m ` g h c g Z getPhoneType() b getNetworkType (). W l b f _ l h ^ \ h a \ j Z s Z x l p _ e h q b k e _ g g u _ d h g k l Z g l u h i j _ ^ _ e y x s b h _ l \ h c k \ y a b

F_lhg^getPhoneType() hij_^_ey_l lbi fh[bevgh]h l_e_nhgZ b
ba q_lujZo_p_g:bc

^ PHONE_TYPE_GSM² l_e_nhg klZg^ZjlZ (GSM) (Global System for Mobile communications,]eh[Zevgbc ijh\kcZg^Zjlykhlh\kcyabWlhl klZg^Zmjl fZx ba_kl_g \k_fZa hjgZ [[huleZg ?\jbhfibgkbblmf klZg^Zljlh\ e_dhffmdZbc (7 6, 80-o]^hZoKlZg^Z*j60 gZ k_]h^gyrgb y\ey_lky gZb[he__ jZgkujfhklZZbgf^Zk\yab

^ PHONE_TYPE_CDMA² CDMA (Code Division Multiple Access, sfgh`_kl_ggukc lmi k dh^h\uf jZa).^ Wlhgbh eh]fhy[bevghc k\yab ijbZdl gZeu i_j_^Zqb bf_xl h[smx ihehkm qZklhl gh jZagm

^ PHONE_TYPE_SIP ² SIP (Session Initiation Protocol, ijhlhdhbegbpbbZaeZpkhb _^bg_)gbGy kfhljy gZ lh qlh wlZ l_ogheh]by ba_kkgZ ihevam_lPkly e_nhgbh^_ij`dZ 6,3 \ $QGURlhGc_ifhy_b^eZZ \ _jkbb $QGUZPBl(APIlevel9);

^ PHONE_TYPE_NONE² wlh agZq_gbbevlam_lky _ke-bhihjbdZbdgZf l_e_nhgZ g_ ih^oh^bl ih^ ij^^e^gmlsyb_ hij

F_lhg^getNetworkType() hij_^_eyxsbc lbi khlh\hc k_lb h a lhjhc \ ^Zgguc fhf_gl gZoh^blky fgh[bevgZ_cl l]hejZa^hh [h \ZjbZglh\ agZq_gbc getPhoneType(), f_lh^

^ NETWORK_TYPE_GPRS² k_lbGPRS (General Packet Radio Service, k_lkiZd_lghc i_j_^Zq^Zcgg)uWlh jZkrbj_lgbogheh]bb ^*e,iZdglhc i_jqh^Z ^Zgguo_oghe]bbGPRSiha\hey_l ihevah\Zl_ex fh[bevghh] ba\h^blv h[f_g ^Zggufb k ^jm]bfb mkljhckl\Zfb _k_ lyfb \ lhf qkbEkel_jghfl<_kv ihlhd ^Zgguo hlijZ\bl_ey hl^_evgZd_lu b aZl_f ^kkZhemqlZL_oghe]bbGPRSiha\ye _l i_j_^Z\Zlv ^Zggu_ gZ kms_kl_kgbhkl[yheq__f\ukhf[dh GSM-k_lb

^ NETWORK_TYPE_CDMA² k_lvCDMA (wlZ l_ogheh]by m`_ [ueZ h \wlhf jZa;^_e_

^ NETWORK_TYPE_1xRTT ² k_lb1xRTT (One Times Radio Transmission Technology). Wlhfh[bevgZy l_ogheh]by i_j_^Zqb, phkmjhgbZZy ^gZZg&'0 l_ogheh]bb gh bkihjevgpbix_sjZy^Zqb fkmbZhfb_clhZd

^ NETWORK_TYPE_EDGE² k_lbEDGE (Enhanced Data Rates for Global Evolution, l_o gheh]buykhdhkdhjhklgh^cZ^qZggu k_lyGSM). L_ogheh]bEDGE y\ey_lky jZkmbjf l_ogheh]bb i_j_^Zqb ^Zggu Zekh\dhe m_ebq_gby ijhimkdgkhlb kwhhk]hm[k_j\bkZ

^ NETWORK_TYPE_EHRPD k_lbEHRPD (Evolved High-Rate Packet Data memgbZy l_ogheh]bkyhdhkdhjhklghc iZdZqlgh^cZ^gju_^

^ NETWORK_TYPE_LTE ² k_lbLTE (Long Term Evolution). L_ogheh]bLTEy\eykky mkh_jr_gkl\h\Zgb_f l_ogheh]bc &'0$ b 8076 k ih\u j_^Zqb ^Zggu `_lghhkblky d k_lyf q_l_jlh]b);ihdhe_gby

^ NETWORK_TYPE_EVDO_0, NETWORK_TYPE_EVDO_A, NETWORK_TYPE_EVDO_B ² k_lbbiZ EVDO (Evolution-Data Optimized). Wlh l_ogheh]by i_j_^Zqb ^Zggu fZy \ k_lyo khlh\hc k\yCDMA-1X, g^ZjlZ

^ NETWORK_TYPE_HSPA² k_lhHSPA (High SpeedPacketAccess lo_g heby]\ukh dhkdhjhkilgjhc^Zqbgg0)Z
^ NETWORK_TYPE_HSDPA² k_lhHSDPA (High SpeedDownlink PacketAccess). Wlh jZkrbj_gHSPA² l_ogheh]by \ukhdhkdhjhklghc i_j_^ZZq ijZ\e_gbk kb_lgZ fh[bevgh_l\mkljhck
^ NETWORK_TYPE_HSUPA² k_lhHSUPA (High SpeedUplink PacketAccess). Wlh d_ gheh]by Zezh]bHSDPA, \ukhdhkdhjhklghc iZd_lghc i_^jey^ i_j_^Zqb ^Zgg0dgh\fhg[ZijZ\e_gbb hl fh[bevgh]h;mklj
^ NETWORK_TYPE_IDEN² k_lhIDEN (Integrated Digital Enhanced Network). Wlhgb l_]jbjh\ZggZy l_,ohhe_h^]by yxsZy]jmiih\mx ^bki_lq_ kkhlh\hc l_e_nhgg kbc lk\yghehh]bx^Zqb Zenzbhjh\ub k h[s_gbc ^Zgguhgz [ueZ jZajzd[hfliZgMotorola ^ey ihkljh_ l_e_dhffmgbdZpbhgguo kbkl_f ^eZpl;bevrbo hj]Zgba
^ NETWORK_TYPE_UMTS² k_lhUMTS (Universal Mobile Telecommunications Sym). Wlhl lb_lbkij_^klZ\ey_lmkkh[\hcir_gkl\h\Zggmxkh[Zahk\mx GSM b jZ^bhbgl_jn_ck ih WCDMAehjWbZ l_ogheh]by l jZajZ[hlZgZ mbgfETSI
^ NETWORK_TYPE_UNKNOWN² agZq_gb_ \ha\jZsZ_fh_ \ kemqZ_ ba_kl_g beb g_ ih^oh^bl ih^ ij_gbymsb_ hij_^_e Dhg_qgh \ h^ghf f_kl_ klhevdh lbih\ k_l_c hx^kgyhgih [b[ehb_dazZ android.tel ephony ij_^mkfZljb\Z_l \k_ \hafh`gu_ dlb fh[bevgu_ l_eAndroidu^he`gu jZ[hlZlv \ ex[hc lhqd_ fbj khd dhgklZglk \TelephonyManager hij_^_eyxsbc lbiu k_l_c ihihegy:_kkydZ`^hc gh\hcAndroidSDK h[ugh ^h[Z\eyxgkZy\h gh\u_ dhgklZglu

Hij_^_e_gb_ [Zah\hc klZgpbb khlh\hc k\

>ey ihemq_gby bgnhjfZpbb h [Zah\hc klZgpbb k_ TelephonyManager ij_^mkfhlj_g getCellLocation() . Wlhl f_lh^jZsZ_l h[t_dlCellLocation .

KZf lbiCellLocation y\ey_lky Z[kljZdlguf deZkkhf gh hl ^\Z deZkkZ dhlhju_ \ aZ\bkbfhklb hl lbiZ bkihevam ^ey ihemq_gby bgnhjfZpbb h: [Zah\hc klZgpbb

^ GsmCellLocation² ^ey k_l_c *60
^ CdmaCellLocation² ^ey k_lCDMA.

DeZkkGsmCellLocation bf__l gZ[hj f_lh^h\ ^ey hij_^_e_gby khlh\hc k\yab

^ getCid()² \ha\jZsZ_l b^_glbnbdZlhj [Zah\hc kl;Zgpbb k
^ getLac()² \ha\jZsZACl (Location Area Code). Wlh l_jjblhjbZevlgZy \ ij_^_eZo dhlhjhc \ ^Zgguc fhf_gl gZoh^blky cZlhZ_g
^ getPsc()² \ha\jZsPSC (Primary Scrambling Code). Wlhdh^ [Zah\hc pbb ^ey k_l_c 8076 getPsc() lhhy\beky \ GsmCellLocation g_^Zh Zgbg ZAndroid SDK 2.3.1(API Level 9).

D e Z k k CdmaCellLocation ij_^gZ q g Z e y k_ CDMA b y\ey_lky "[hh_ ^\bmhuf' ihkjZ\g_gbkke Zhkk GsmCellLocation . ?]h gZ[hj f_lh^h\ ih ihemqblv [hey m x ib gnhjfZpbx h [Zah\hc CDMA Z gpbb k_lb

- getBaseStationId() ² \ha\jZsZ_l b^_glhj[Zd Z\hc klZgpbb
- getNetworkId() ² \ha\jZsZ_l b^_glbnbd CDMA j k_lb
- getSystemId() ² \ha\jZsZ_l kbkl_fguc b^_glbnbd CDMA Zlhj k_lb
- getBaseStationLatitude() ² \ha\jZsZ_l]_h]jZnbq_kdb_ dhhj [Zah\hc klZgpbb
- getBaseStationLongitude() ² \ha\jZsZ_l]_h]jZnbq_kdb_ dhh lu [Zah\hc klZgpbb

Hij_^_e_gby khklhyg b_ah\Z

>ey hij_^_e_gby khklhyg b_ah\Z e_nhgZ TelephonyManager k_ ij_^mkfhlj_g getCallState() Wlhl f_lh^ \ha\jZsZ_l p_eZhd q_gb_ dhlhjh_ hij_^_ey_l ljb ybay h`guo khklh

- CALL_STATE_IDLE ² l_enhgg_Zdlb_g
- CALL_STATE_OFFHOOK ² ijhba\h^bihkyuld Zuah\Z
- CALL_STATE_RINGING ² l_e_nhghklhyg b_ah\Z b^bg_kgZhy_gl.hf

Wlhlf_lh^ iha\hey ke_`b\Zlv khklhyg b_dh^e_ijbeZ`_lhb [uijb gh[oh^bfhklb ijhlbai_^_e_ggu_ ^_ckl\by

Ihemq_gb_ bgnhjfZpbb h jhmfbg]_

?keb Z[hg_gl gZoh^blky \ ^jm]hf]hkm^Zjkl_ bep a kem`b\Zgby k\h_]h k_l_\h]h hi_jZlhjZ \ ijbeh`_gbZb pbx h ih^dexq_gbb jhmfbg]Zo p_e_c TelephonyManager _klv f_lh^ isNetworkRoaming() , dhlhjuc \ha\jZsZ_l i_j_f_bgam x hbZ au\Zxsmx gZoh^blky eb ^Zgguc Z[hg_gl \ jhmfbg]_

Bkihevha\Zgbd e Zk k TelephonyManager \ ijbeh`_gbb

DZd \u \b^bl_ TelephonyManager , ij_^klZ\eyxsbc k TelephonyService, iha\hey_l ihemqblv [hevrh_ dhebq_kl\h kZfhZ pbb K_cqZk fu ihijh[m_f \ ijZdlbq_kdhf ijbeha`f_g b klb ij_^hklZ\ TelephonyManager Kha^ZkE_ Eclipse gh\uc ijh_Zl ihegb\ ke_^mxsb_ ihey \ ^hZ Android Project _

- Project name: PhoneInfo,
- Application name: Phone info,
- Package name: com.samples.telephony.phoneinfo,
- Create Activity: PhoneInfoActivity.

l J B F ? Q : G B ?

Iheguc dh^ ijbeh`_gby gZ ijbeZ]Z_fhf d^ dkgb]_gZ h Zdllky \ d Ch03_PhoneInfo.

< nZce fZgbn_klZ ijbeh`_gbyAndroidManifest.xml h[yaZl_e^hgZ\vjlZa j_r_gbyREAD_PHONE_STATE qlh[u ijbeh`fhgbyihemqZlv bgnhjfZ kbkl_AndroidhkhklhyjbeB_nhgjZaj_r_gbyACCESS_COARSE_LOCATIONey ihemq_gby bgnhjfZpbb h [Zka_hkhchkhZcgbyZadbihdZaZkgh lbg]_ \u^_e_gh ihem`bjguf rjbnlhf bgZq_ ijb aZim [m^_l]_g_jbjh\Zlvkyb.bkdexq

Ebklbg 3.1. NZce fZgbn_klZ ijbehAndroidManifest.xml

```
<?xml version="1.0" encoding="utf - 8"?>
<manifest xmlns: android="http://schemas.android.com/apk/res/android"
    package="com.samples.telephony.phone info"
    android:versionCode="1" android:versionName="1.0">

    <application android:icon="@drawable/icon"
        android:label="@string/app_name">
        <activity
            android:name="PhoneInfoActivity"
            android:label="@string/app_name">
          <intent - filter>
            <action android:name="android.intent.action.MAIN" />
            <category android:name="android.intent.category.LAUNCHER" />
          </intent - filter>
      </activity>
    </application>

    <uses - permission
        android:name="android.permission.READ_PHONE_STATE" />
    <uses - permission
        android:name="android.permission.ACCESS_COARSE_LOCATION" />
</ manifest >
```

< nZce dhfihgh\db hdgZ ijbehmain_xml`^_gbyZ\vl_ l_dklh\h TextView ijbk\hcl_ _fm b^_gbyandroid:id="@+id/text" . < wlh ihme_ ^_l \u\h^blvky bgnhjfZpby h fh[bevghf l_e_nhg_ bck_ eZ dhfihgh\dbmain.xml ihdZaZegbklbg 3.2.

Ebklbg 3.2. NZce dhfihgh\db hdgZ ijbemain_xmlby

```
<?xml version="1.0" encoding="utf - 8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="fill_parent"
    android:layout_height="fill_paren t"
    android:orientation="vertical">

    <TextView
        android:id="@+id/text"
```

```
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="5px"
        android:textStyle="bold"/>

</ LinearLayout    >
```

< gZr_f deZhkk_PhoneInfoActivity [m^_klha^Z\Zaldkay_fi TelephonyM a-
nager ba dhlhjh]h fu kfh`_f ihemqblv \kx gm`gmx bgm
k_lb khlh\ya b kDh^ dhZkkZ PhoneInfoActivity ij_^klZ\e_g \ e3bklbg]_

Ebklbg 3.3. NZcedeZkkZ]eZ\bhlhZjbeh`_gbPhoneInfoActivity .java

```
package com.samples.telephony.phoneinfo;

import android.app.Activity;
import android.content.Context;
import android.os.Bundle;
import android.telephony.TelephonyManager;
import android.telephony.cdma.CdmaCellLocatio                n;
import android.telephony.gsm.GsmCellLocation;
import android.widget.TextView;

public class PhoneInfoActivity extends Activity {
    private TextView text;
    private TelephonyManager manager;

    @Override
    public void onCreate(Bundle savedIns              tanceState) {

        super.onCreate(savedInstanceState);
        this.setContentView(R.layout.main);

        text = (TextView)findViewById(R.id.text);

        manager = (TelephonyManager)getSystemService(
                Context.TELEPHONY_SERVICE);

        text.append("     \ nCallState:     \ t" +
                convertCallStateToString          (manager.getCallState()));
        text.append("     \ nDevice ID:     \ t" +
                manager.getDeviceId());
        text.append("     \ nDevice Software Version:          \ t" +
                manager.getDeviceSoftwareVersion());
        text.append("     \ nLine1 Number:     \ t" +
                manager.getLine1Number());
```

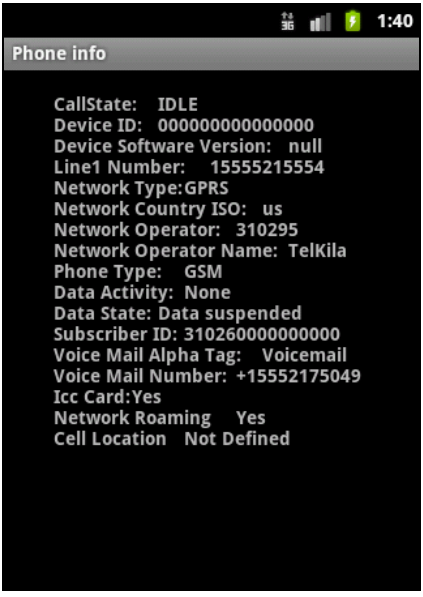
```
        text.append("      \ nNetwork Type:     \ t" +
                    convertNetworkTypeToString(manager.getNetworkType()));
        text.append(      " \ nNetwork Country ISO:         \ t" +
                    manager.getNetworkCountryIso());
        text.append("      \ nNetwork Operator:       \ t" +
                    manager.getNetworkOperator());
        text.append("      \ nNetwork Operator Name:        \ t" +
                    manager.getNetw    orkOperatorName());
        text.append("      \ nPhone Type:   \ t" +
                    convertPhoneTypeToString(manager.getPhoneType()));
        text.append("      \ nData Activity:          \ t" +
                    convertDataActivit          yToString(manager.getDataActivity()));
        tex  t.append("     \ nData State:      \ t" +
                    convertDataStateToString(manager.getDataState()));
        text.append("      \ nSubscriber ID:        \ t" +
                    manager.getSubscriberId());
        text.append("      \ nVoice Mail Alpha Tag:           \ t" +
                    manager.getVoiceMailAlphaTag());
        text.append("      \ nVoice Mail Number:        \ t" +
                    manager.getVoiceMailNumber());
        text.append("      \ nIcc Card:     \ t" +
                    manager.hasIccCard());
        text.append("      \ nNetwork Roaming:     \ t" +
                    manager.isNetworkRoaming());

        GsmCellLocation gsmCell =
                  (GsmCellLoc   ation)manager.getCellLocation();
        if (gsmCell != null) {
              text.append("      \ nGSM Cell Location:");
              text.append("      \ n\ tCID:  \ t"    + gsmCell.getCid());
              text.append("      \ n\ tLAC:  \ t" + gsmCell.getLac());
        }
    }

    private String convertCallStateToString(int callState) {
        switch (callState) {
              case TelephonyManager.CALL_STATE_IDLE:
                    return "IDLE";
              case TelephonyManager.CALL_STATE_OFFHOOK:
                    return "OFFHOOK";
              case TelephonyManager.CALL_STATE_RINGING:
                    return "RINGING";
              default:
                    return "Not defined";
        }
    }

    private String convertNetworkTypeToString(int networkType) {
```

```
        switch (networkType) {
                case TelephonyManager.NETWORK_TYPE_1xRTT:
                        return "1xRTT";
                case TelephonyManager.NETWORK_TYPE_CDMA:
                        return "CDMA";
                case TelephonyManager.NETWORK_TYPE_EDGE:
                        return "EDGE";
                case TelephonyManager.NETWORK_TYPE_EVDO_0:
                        return "EVDO revision 0";
                case TelephonyManager.NETWORK_TYPE   _EVDO_A:
                        return "EVDO revision A";
                //case TelephonyManager.NETWORK_TYPE_EVDO_B:
                    //      return "EVDO revision B";
                case TelephonyManager.NETWORK_TYPE_GPRS:
                        return "GPRS";
                case Tel    ephonyManager.NETWORK_TYPE_HSDPA:
                        return "HSDPA";
                case TelephonyManager.NETWORK_TYPE_HSPA:
                        return "HSPA";
                case TelephonyManager.NETWORK_TYPE_HSUPA:
                        return "HSUPA";
                //case T     elephonyManager.NETWORK_TYPE_IDEN:
                    //      return "iDen";
                case TelephonyManager.NETWORK_TYPE_UMTS:
                        return "UMTS";
                case TelephonyManager.NETWORK_TYPE_UNKNOWN:
                        return "Unknown";
                default:
                        return "Not defined";
        }
}

private String convertDataActivityToString(int dataActivity) {
        switch (dataActivity) {
                case TelephonyManager.DATA_ACTIVITY_DORMANT:
                        return "Dormant";
                case TelephonyManager.DATA_ACTIVITY_IN:
                        return "In";
                case TelephonyManager.DATA_ACTIVITY_INOUT:
                        return "In       - out";
                case TelephonyManager.DATA_ACTIVITY_NONE:
                        return "None";
                case TelephonyManager.DATA_ACTIVITY_OUT:
                        return "Out";
                default:
                        return "Not defined";
        }
```

```
    }

    private String convertDataStateToString(int dataState) {
        switch (dataState) {
            case TelephonyManager.DATA_CONNECTED:
                return "Data connected";
            case TelephonyManager.DATA_CONNECTING:
                return "Data connecting";
            case TelephonyManager.DATA_DISCONNECTED:
                return      "Data suspended";
            case TelephonyManager.DATA_SUSPENDED:
                return "Data suspended";
            default:
                return "Not defined";
        }
    }

    private String convertPhoneTypeToString(int phoneType) {
        switch (phoneType) {
            case TelephonyManager.PHONE_TYPE_GSM:
                return "GSM";
            case TelephonyManager.PHONE_TYPE_CDMA:
                return "CDMA";
            case TelephonyManager.PHONE_TYPE_NONE:
                ret  urn "NONE";
            default:
                return "Not defined";
        }
    }
}
```

Kdhfibebjmcl_ b aZimklbl_ ijbeh`_gb_ gZ \Zr_f fZh[
\bkbhklb hl lbiZ ih^dexq_gby b k_lb khlh\hc k\yab
^hklmigmx hjfZpxbgZ wdjZg fh[bevgh]h mkljhckl\Z 3.1G Z
ij_^klZ\e_g `\gnafh\ZjbZgl \u\h^Z ^Zgguo h l_e_nhg_
^ey dhgdj_lg_m]hhgZ_eih^dexq_gghh]h d k_lb
< ijbgpbi_ wfmeyl lZd`_khklhygbb jbnf\bZlbvh^dexq_g
d k_lb khlh\hc k\yab lhwlhfm qZklv nmgdpbhgZevhgh
`_gby \iheg_ fh`gh hleZ`b\Zlv gZ wfmeylhj_ ljbf_ji \
klhygbb l_e_nhgZ b khlh\hc k_lb ijb jZa_jlu\ZgbAn-ij
droid ihdZ gZgZ 3b2k
< p_ehf ^ey l_klbjh\Zgby b hleZ^db ijbeh`_gbc ih
wfmeylhj $QGURLG ^Zd`_ijm^ihfgh_s_b lgkljmf_glZ 'DOYL
6HUYHU fh`gh bfblbjh\Zlv ^bgZfbdm baf_g_gbc khZlh
ijbf_ji_j_oh^ ba h^ghc k_lb \ ^jm]mx lh^jh[gZa_Zghh[^wZ
\ wlhc]eZ_ Z k_cqZk fu jZkkf-hlZ]blf_^fhk[hmeivgh]hgZl_e_n
```
```

Jbk 1. <u\h^ bgnhjfZpbb h l_e_ gZ j_Zevghf fh[bevghf mkljhc



Jbk3.2. <u\h^ bgnhjfZpbb h l_e_ gZ wfmeylhj_ $QGURLG

>hklmiSIM-dZjl_

Bkihevamy TelephonyManager fh`gh ihemqblv ihe_agmx hSIM-dZjl_ fh[bevgh]h l_e_nhgZ >ey TelephonyManager c \jde ^mkfhlj_ggkhdhevdh f:lh^h\

- getSimCountryIso() ² \ha\jZsZdhl^hkm^Zjkl\Zlhjhgf Zohh^bSIM-ijh\Zc^kjhlh\hkd\yabWlhdh^khhl_lkl\fm`^mgZjh^ghfm kl ISO b bkihe2-[mdl_ggucalhha^ ^ey hZlqagby]hkm b l_jjblhjbZcjbfg_jru,swbl. ^
- getSimOperator () ² \ha\jZsZklJhdMCC+MNC (Mobile Country Code + Mobile Network Code, dh^]hkm^Zjkl\Zh[bedgh^cf kjhl\bZc^SIM-dZjl)u WlZ kljhdZkyy\]eyh[lZevguf b^_glbnbdZlhjhf hi_ ghc k\yab
- getSimOperatorName() ² \ha\jZsZSPN (Service Provider Name, bfyk_j\bk ijh\Zc^);jZ
- getSimSerialNumber () ² \ha\jZsZk_ljbcggbf_SIM-dZjluijbmkeh,\b qlhhg^hklmi;g
- getSimState () ² \ha\jZsZp_lehqbke_bg^gugclbnbdZhlhj_^_eyxs khklhygSIM-dZjlu

DZd \u \b^bl_ gZ[hj f_lh^h\ ^ey ijh]SIM-fdgZhj]lh_ ^hkl\m ij_^hklZ\ey_dfeuZkkhTelephonyManager ^h\hevgh h]jZgbq_ggb nhjfZpbx lhevdh ^ey ql_gby Wlh k^_eZgh ih khh[hZ` \Zl_e_c fh[bevghhgZl_e_n

Chklhyg SIM-dZjlu

K ihfhsvx f_lhs^Z getSimState() \ ijbeh`_gbb hfhh`gj_^_eblv l_ khklhyg SIM-dZjlu P_eh_ qbkeh \ha\jZ e getSimState() f_lhf^hh`f_l \ aZ\bkbfhklb hl kSIM-dZjlu b y ijbgbfZlv agZq_gby hgj_ klZglZfb h[tyfb_\g d e TelephonyManager :

- SIM_STATE_READY² SIM-dZjl^Zhklm;igZ
- SIM_STATE_ABSENT² SIM-dZjlZlkmlkl\gmZ_h[bevgmkljhlc_k
- SIM_STATE_PIN_REQUIRED² SIM-dZjlaZZ[ehdbjh\Zdhe vah\Zlj_e[yh_ ky_klb PIN-dh^eyZa[ehdbjh\ZdZgjbu
- SIM_STATE_PUK_REQUIRED² SIM-dZjlaZZ[ehdbjh\Zdhe vah\Zlj_e[yh_ ky_klb PUK-dh(8-agZqgdh)^^eyZa[ehdbjh\ZgdZyjtu
- SIM_STATE_NETWORK_LOCKED² SIM-dZjlaZZ[ehdbjh\Zdhe vah\Zlj_e[yh _lky_klb_l_\PIN-dh^eyZa[ehdZgbydZjtu
- SIM_STATE_UNKNOWN² khklhyg SIM-dZjlg_ah_klgh

Wlb dhgklZglu fh`gh ijbf_hg`_lgbyoijb\e dhlhjuo lj_dm pbhgZevghklv ^ey hij_^_e SIM-dZjl^ klhukl hgZgjbyf_j ^ey _Z\ kdhc jZkk SMS db

>hklmi SIM-dZjl_ ba ijbeh`_gby

>Z\Zcl_ l_i_jv kha^Z^bf ijbeh`_gb_ dhlhjh_ kih dSIM-dZjl_ fh[bevgh]hmhlgZ b bgnhjfZpbx h \k_o __ ^hkl >ey wlh]h hldE Eclipse \ Android b aZihegbl_ khkl_ sb_ ihey \ ^bZeh]h New Android Project:

- Project name: SimInfo;
- Application name: SIM Card info;
- Package name: com.samples.telephony.siminfo;
- Create Activity: SimInfoActivity.

l JBF?Q:GB?

Iheguc dh^ ijbeh`_gby gZ ijbeZ]Z_fhf d^ dkgb]_gZ hf Zdllky \ d Ch03_SimInfo.

< nZcef Z gbn_ kjZeh`_g AndroidManifest.xml ^h[Z\vjlZ aj_r_g^ey ql_gky hklhyg_ben hgZ READ_PHONE_STATE dZd \ eb3.1.b>gej dhfihgh hdgZ ijbeh`_gby bkihemainmnl ij n Zkl Z_gguc \ eb3.2.bg]_

DeZkk]eZ\gh]h hdgZ SimInfoActivity gby\ p_ehf ZgZeh]bq_ PhoneInfoActivity ba ij_^u^ms_]h ijbf_jZ SimInfoActivity Dh^ deZkkZj_^ klZ\e_g \ eb3.4.bg]_

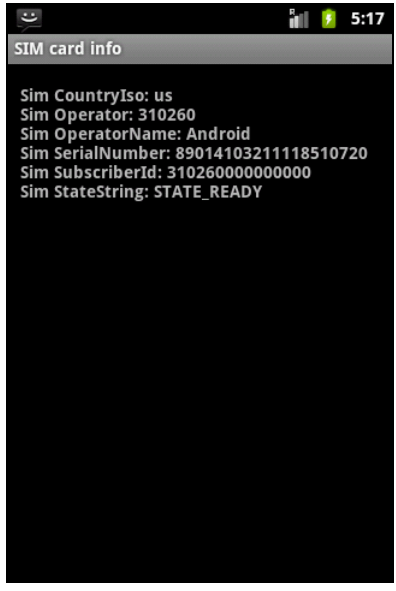
EbklbgZ NZcde ZkkZ]eZ\gh]h ijbeh`_gby SimInfoActivity .java

```
package com.samples.telephony.siminfo;

import android.app.Activity;
```

```
import android.content.Context;
im port android.os.Bundle;
import android.telephony.TelephonyManager;
import android.widget.TextView;

public class SimInfoActivity extends Activity {

    private TextView text;

    @Override
    public void onCreate(final Bundle savedInstanceState)                    {
        super.onCreate(savedInstanceState);
        this.setContentView(R.layout.main);

        this.text = (TextView)findViewById(R.id.text);

        final TelephonyManager manager = (TelephonyManager)getSystemService(
                Context   .TELEPHONY_SERVICE);

        String simCountryIso = manager.getSimCountryIso();
        String simOperator = manager.getSimOperator();
        String simOperatorName = manager.getSimOperatorName();
        String simSerialNumber = manager.getSimSerialNumb                er();
        String simSubscriberId = manager.getSubscriberId();
        int simState = manager.getSimState();

        String sSimStateString = "Not Defined";

        switch (simState) {
            case TelephonyManager.SIM_STATE_ABSENT     :
                sSimStateString = "ABSENT";
                break;
            case TelephonyManager.SIM_STATE_NETWORK_LOCKED:
                sSimStateString = "NETWORK_LOCKED";
                break;
            case TelephonyManager.SIM_STATE_PIN_REQU     IRED:
                sSimStateString = "PIN_REQUIRED";
                break;
            case TelephonyManager.SIM_STATE_PUK_REQUIRED:
                sSimStateString = "PUK_REQUIRED";
                break;
            case TelephonyManager.SIM_STATE_RE      ADY:
                sSimStateString = "STATE_READY";
                break;
            case TelephonyManager.SIM_STATE_UNKNOWN:
                sSimStateString = "STATE_UNKNOWN";
                break;
```

```
        }

        text.setText(
                " \ nSim CountryIso: " + simCountryIso +
                " \ nSim Operator: " + simOperator +
                " \ nSim OperatorName: " + simOperatorName +
                " \ nSim SerialNumber: " + simSerialNumber +
                " \ nSim SubscriberId: " + simSubscriberId +
                " \ nSim StateString: " + sSimStateString);
    }
}
```

Kdhfibebjmcl_ b aZimklbl_ ijbeh`_gb_ gZ \Zr_f fm[ eylhj $QGURLG kihkh[_SIM-kdZjl_ b\Zlh ijbeh`_gb_ a wfmeylhj Android lZ_ \u^Zkl bgnhjfZpbb SIM-kdZjl_ 3b3k



Jbk 3. <u\h^ bgnhjfZpbb SIM-kdZjl_

l_j_o\Zl baf_g_gbc khklhygby iZjZf_ljh\l_e_nhgZ

Fh[bevguc l_e_nhg ihklhyggh i_j_f_sZ_lky \f_kl_ k wlhf fh`_l baf_gylvky mjh_gkhklh\hc ekZ\yka_blblbi k_ilb ghklv b _s_ p_euc jy^ ^jm]bo iZjZf_ljh\

>ey hlke_`b\Zgby wlbo baf_g_gbc khklhyg iZd_ij_^gZagZ deZkk khoneStateListener . Wlhl deZkk kh^_j`bl h[ty\ehbjZy gh]

\uah\Z ij_^gZagZq_gguo ^ey ijhkemrb\Zgby jZaeb_qg
e_nhgZ lb\hkchk_lb

<hl hkgh\gu_ f_lh^u hij_^_e PhoneStateListener deZkk_

- onCallStateChanged() ² \uau\Z_ijkbybaf_g_gkhlklhygubayh\Z_e_hn g,ZgZijbf,_gjh]^mZkljhckil\hj_oh^bakhklhygnb`y^Zg\bkyhklhyg \uah.\Z,b wlhf i_j\uf iZjZf_ljhf \ f_lh^ i_j_^Z_lky p_ gb_ hij_^_eyxs__ gh\h_ khklhygb_ lCALL_STATE_IDLE,dh CALL_STATE_OFFHOQKCALL_STATE_RINGING), Z \lhjuf iZjZf_ljhf i_j_ ghf_j \oh^ys_]h \uah\Z
- onCellLocationChanged() ² \uau\Z_lky ijb kf_g_ [Zah\hc klbZgp
- onDataActivity () ² \uau\Z_iljkbykf_gg_Zij\Ze_gbiyj_^Z^qZbgguo
- onDataConnectionStateChanged( ) ² \uau\Z_lkybaf_g_gkhlklhygkhly _^bg_gbjy_^Z^qZbgguo
- onServiceStateChanged () ² \uau\Z_ijkybaf_g_gkhlklhygh[ybefvgh] mkljhckl\Z
- onSignalStrengthsChanged () ² \uau\Z_iljkybaf_g_gnjb\gkyjgZekZ_lb khlh\lkcyab
- onCallForwardingIndicatorChanged () ² \uau\Z_ijkybaf_g_gkhlklhyg [me_\h]h bg^,bdhZlhjuZcdZau\gZZq_Zebqibj__gZijZ\e_gugahl]hZ
- onMessageWaitingIndicatorChanged () ² \uau\Z_ijkybaf_g_gkhlklhyg [me_\h]h bg^bdhZlhjuZc hij_^_ey_l khklhyg SMS-khhl[jsZ\gdb >Ze__ fu jZkkfhljbf \hafh`ghklb ij_^hkhZ PhoneStateListener deZ

^eylhe_`b\Zgby baf_g_gbc oZjZdl_jbklbd k_lb

AZimkd b hklZgh\dZ ijhkemrb\Zgby baf_g khklhygby khlh\hc k_lb

>ey bkihevah\Zlv ^ey PhoneStateListener \ ijbeh`_gkhgbZqZeZhg_ ^bfhkha^Zhl[vt_d PhoneStateListener b hij_^_eghnv`gu_ fZlh^ug_ h[yaZl_evghdhkhju_m^ul[bkihevah\Zlv ^ey i_j_o\ZlZ k

```
private PhoneStateListener listener = new PhoneStateLi                stener() {
    @Override
    public void onCallStateChanged(
            final int state, final String incomin                gNumber) {
        //  ^_ckl\by ijb gZklmie_gbb kh[ulby
    }

    @Override
    public void onDataConnectionStateChanged(int state, in                t networkType) {
        //  ^_ckl\by ijb gZklmie_gbb kh[ulby
    }
    ...
};
```

AZl_f \ dh^_ ijh]jZffu \u ^he`gu ^ey kb]gZeZ TelephonyManager a_f aZj_]bkljbjh\Zlv kemrZl_ev kh[ulbc TelephonyManager h ij_^mZl kfhlj_glh^ listen(), ijbgbZxsbc\ZZjZf_ljZ

- h[t_dh PhoneStateListener, dhlhjuc hij_^_ebjZlg;__
- p_ehqbke_ggmx dhgklZglm hij_^_eyxsmx gm`glb_ jZ_l_kv ijhkemrb\Zlv

Wlb dhgklZglu hij_^_e PhoneStateListener kk_ <hl bo ihelkhd k

- LISTEN_CALL_FORWARDING_INDICATOR;
- LISTEN_CALL_STATE;
- LISTEN_CELL_LOCATION;
- LISTEN_DATA_ACTIVITY;
- LISTEN_DATA_CONNECTION_STATE;
- LISTEN_MESSAGE_WAITING_INDICATOR;
- LISTEN_SERVICE_STATE;
- LISTEN_SIGNAL_STRENGTHS

DZd fh`gh hij_^_eblv ba gZa\Zgbc dZ`^Zy ba wlbo djlghfm f_lh^m h[jZlgh]h \uah\Z h[tyhe PhoneStateListener \ de dhlhju_ m`_ [ueb hibkZgu \ ij_^u^ms_f jZa^_e_ LISTEN_CELL_LOCATION khhl_lkl\m_l onCellLocationChanged().

Fu fh`_f aZj_]bkljbjh\Zlv ijhkemrb\Zgb_ kh[ulbcgba pbb k_lb khlh\hc k\yab ke_:^mxsbf h[jZahf

```
TelephonyManager manager = (TelephonyManager)getSystemService(
                Context.TELEPHONY_SERVICE);
manager.listen(cellLocationListener,
        PhoneStateListener.LISTEN_CELL_LOCATION);
```

?keb \ ijbeh`_gbb gZf lj_[m_lky ijhkemrb\Zlv kjZa j_]bkljbjh\Zlv bo h[jZ[hldm fh`gh h^gh\j_f_ggh ^e-y l_e_c kh[ulbc bkihevamy d:hf[bgZpbx BEB

```
manager.listen(cellLocationListener,
        PhoneStateListener.LISTEN_CELL_LOCATION |
        PhoneStateListener.LISTEN_SIGNAL_STREIGHT);
```

>ey hldexq_gby ijhkemrb\Zgby kh[ulbc \ ijbe PhoneStateListener ij_^mkfhlj_gZ dhgklZgl LISTEN_NONE Qlh[u hklZgh ijhkemrb\Zgb_ baf_g_gbc khklhygby k_lb listen() gZ^h \u-ja_\ ^Zlv _fm \ dZq_kl_ \lhjh]h iZjZlh_cjZ ZhgklZgl gub_

```
manager.listen(cellLocationListener, PhoneStateListener.LISTEN_NONE);
```

Baf_g_gb_ mjh\gy kb]gZeZ

Baf_g_gb_ mjh\gy ijbgbfZ_²fhZh gkZby]gZeZ jfZpby ^ey gbjh\Zgby fh[bevgh]h Qlkljh_cdkvZ mjh_gv kb]gZeZ hl_ ylghklv bdgh_gby hrb[db ijb i_j_^Zq_ beb ijb_f_ ^Z ^ey jZ[hlu ijbeby`djblbq_g mjh_gv kb]gZeZ g_h[oh^ hij_^_eblv onSignalStrengthsChanged(), dhlhjuc [m^_l \uadZ ^ucjZa ijbaf_g_gbjh\gy kb]gZeZ khlh\kyab

Wlhl f_lh^ ijbgbfZ_l iZjsZf_SignalStrength hiZ dhlhjuc hij_^h_e klhygb_ kb]gZeZ klZgpbb khlhf_hc_k\yab Zjzdl_jbyklbd kmjh gZedZeZsk SignalStrength kh^_j`bl g_kdhlhv^hh f

^ getCdmaDbm() ² \ha\jZsZa_glZq_RSSI (Received Signal Strength Indication, bg^bdZlhj mjh\gy ijbgbfZ_).fhA]hZ k_bhgZ_e ZjZdl_jbahm_ _gv ijbgbfZ_fhk]hh]gZ_eZZah\hc klZgpbb khlh\hc k\yab ^;f Wlh_lh^ \ha\jZsZ_l p_²eahg_Zqb_kgeh_ \ ^_pb[_eZo l hihjgh]h mjh\gy fhlsghklb\Zll GZijmbfh_30 dBm jZ_g fhsghklb<l bkihevam_lky eh]Zjbnfbd_Fhk`gZ_y bkdZ_eZa ^Zgguc ihdZ_aZ^ey hij_^jZ_k_gghy^h Zah\hc kbZgk_lbh k \hc k\yab

^ getEvdoDbm() ² \ha\jZsZa_glZq_RSSI_^ey_lk_c (9'2

^ getCdmaEcio() ² \ha\jZsZ_l khhlghr_gby kb]gZe_f (Ec/Io) ijbgbfZ_fh kb]gZe\ZB * 10 ^ey k_CDMA;

^ getEv doEcio() ² \ha\jZsZ_l khhlghr_gby kb]gZe_f (Ec/Io) ijbgbfZ_fh kb]gZe^Zey k_EVDO;

^ getEvdoSnr() ² \ha\jZsZa_glZq_kbhlghr_gby kb]gZe rmh`_lh gZoh^blvky \ ^bZiZahg_ hl\ey^lhky e_mqrbf agZq_gb_

^ getGsmSignalStrength() ² \ha\jZsZa_glZq_mjh\gkyb]gZe GSM Signal Strength;

^ getGsmBitErrorRate() ² \ha\jZsZ GSM Error Rate Error Rate ² wlh j_clb \hafh`ghklb ihy\e_gby hrb[db \ i_j_^Zxs_f beb ijbg \bkfhklb hl khhlghr_gby kb]gZe rmf

AgZq_gbv GSM Signal Strength, GSM Error Rate b mjh_gv kb]gZeZ h \ l_ogkbhc ki_pbnbdZpbb ^ey GSM_TSH27.0785. GZijbf_GSM Signal Strength fh`_l ijbgbfZlv agZq_gby hl ^h 0 ijb mjh\_g kb]gZe 113 dBm b ogb`_1 ijb mjh\g 111 dBm, hl ^h ijb mjh\ 109 g_ ^h 53 dBm, 31 ijb -51 dBm b \ur_99 ² _keb mjh_gv kb]gZeZ g_ _]h g_\hafhafgjhb v

Baf_g_gb[Zah\hkklZgpbb khlh\hk\yab

Ijbeh`_gb_ fh`_l ihemqZlv m_^hfe_gb_ ijb baf_g khlh\hc k\yab < h[jZ[h onCellLocationChanged() i_j_^Z_lky iZjZ lbiZ CellLocation .C ihfhsvx wlh]h iZjZf_ljZ fh`gh hij_^_ebl db [Zah\hc klZgpbb khlh\hc k\yab

Qlh[u hlke_`b\Zlv baf_g_gb_ [Zah\hc klZpbb khlh lj_[m_lky jZaj ACCESS_COARSE_LOCATION dhlhjhh[gh^bfh ^h[Z\blv fZgbn_klZ ijbeh`_gby

<uses - permission android:name="android.permission.ACCESS_COARSE_LOCATION"/>

Fhgblhjbg] khklhygby ih^dexq_gby d k_j

Ijbeh`_gb_ fh`_l ihemqZlv mjb_^hfe_gb_ \ h[kem gZijbf_j ijb ihiZ\Zahlgbm ^_ckl\by k_lb ^jm]h]h hi_jZ mjh\g_ beb ijb hlkmlkl\bb kb]gZe_ZeZ[Zah\hc kZlgpbb

onServiceStateChanged (), dhlhjhfm i_j_^Z_lky iZjZf_ServiceState biZ
DeZ kServiceState hij_^_ey_l khklhygb_ ih^dexq_gby d k
b^_glbnbpbjm_l hi_jZlhjZ khjZ khlbe
< deZ kServiceState _klv f_getState() \ha\jZsZxhs^bgch ba xke_
sbop_ehqbkueoaggZqcgb
^ STATE_IN_SERVICE ² khlh\uc k_j\bk ^hklmi_g ^ey ;^Zggh]h Z
^ STATE_EMERGENCY_ONLY ² jZaj_r_ghuevvhklj_g\guah;\u
^ STATE_OUT_OF_SERVICE ² Z[hg_lgle_nhggZ[kem`b\Z_lky
^ STATE_POWER_OFF ² i_j_^Zlqbqbevghmjkljhckhl\Zexq_Wglhl j_`b
h[uqgh klZ\blky ijb \dxq_gbb AirplaneMode._nhgZ
< deZ kServiceState lZd`_ bf__lky gZ[hj f_ihe^mq_gby b hi
l_evghc bgnhjfZpbb h[hi_jZlhj_ khlh\hc k_lb
^ getOperatorAlphaLong () ² \ha\jZsZ_l ihegh_ bfy hi_jZlhjZ ak_
^ getOperatorAlphaShort () ² \ha\jZsZ_khdZjs_gghbfy hi_jZ;lhjZ
^ getOperatorNumeric () ² \ha\jZsZb^_glbbhZlhji_jZlhjZ
Djhf_wlh]h m deZ kZ _klv [mef_\uh^u ^ey bg^b
khklhygby jhgmfbg]Z getRoaming() bgetIsManualSelection(), dhlhjuc \ha\jZ
true _keb i_j_dexq_gb_ hi_jZlhjh\ mklZgh\e_gbb false \² jm
_keb \ Z\lhfZlbq_kdhf

Ijbeh`_gb_ ^ey ijhkemrb\Zgby baf_g_gbc khklhygby khlh\hc k_lb

<hafh`ghklv hlke_`bZ\Zlvm^bgaf_g_gbc khklhygby khl
hdZaZlvky hq_gv ihe_aghc ^ey ijbeh`_gbc dhlhju_
dhffmgbdZpbb ^ey i_j_^Zqb b ijb_fZ ^Zgguo K_cgZ
gb_ dhlhjh_lkm^_b\Zlv baf_g_gby khklhygbkyhkh^ZhlE_c
Eclipse gh\uc ijhAndroid aZihegb\ ke_^mxsb_ ihey \ NewZe
Android Project:

^ Project name: PhoneChangeStateInfo;
^ Application name: com.samples.telephony.phonechangestateinfo;
^ Package name: com.samples.telephony.phonechangestateinfo;
^ Create Activity: PhoneChangeStateInfoActivity

l JBF?Q:GB?

lheguc dh^ ijbeh`_gby gZ ijbeZ]Z_fhf d^ bkgb]_gZhf^Zhllky \ dZ
Ch03_PhoneChangeStateInfo.

< nZce_ dhfihgh\db hdgZ ijbeh`_gby fu jZkiheh`bf
Start bStop ^ey aZimkdZ b hklZgh\db fhgblhjbg]Z bStart b^_
bbStop LZd`_ kha^Z^bf l_dkxhewh_kibe_glbnbdZ ^hjhfyu\
\h^Z bjfZhpbb h[baf_g_gbyo khklhygby k_lb
NZce dhfihgh\db hdgZ mijhxemh`ij_^bkylZ\e_gkl bgeb_ 3.5.

Ebklbg.5. NZce dhfihgh\db hdgZ ijbmain_xml by

```
<?xml version="1.0" encoding="utf - 8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:orientation="vertical"
    android:layout_margin="5px">

    <LinearLayout
        android:layout_height="wrap_content"
        android:layout_width="fill_parent">

        <Button
            android:id="@+id/bStart"
            android:la yout_height="wrap_content"
            android:text="Start"
            android:layout_width="fill_parent"
            android:layout_weight="1"/>
        <Button
            android:id="@+id/bStop"
            android:layout_height="wrap_content"
            android:layout_width="fill_parent"
            android:text="Stop"
            android:layout_weight="1"/>
    </LinearLayout>

    <TextView
        android:id="@+id/text"
        android:text=""
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textStyle="bold"/>
</LinearLayout>
```

< d e Z k k PhoneChangeStateInfoActivity h i j _ ^ _ e a b Z d j u l i m x j _ f _ g g i m s-x
te ner l b i Z PhoneStateListener , \ g m l j d b h l h j h j c Z e b a h m [j Z [h l q k d h [u l b c
j Z a e q b u o b a f _ g _ g k b h c k l h y g k b _ y b B g n h j f Z p b y h i j h b k o h ^ y s b o
[m ^ _ l ^ \ e y Z v k y \ l _ d k l h t e x t _ i h e _
D h ^ d e Z k k Z PhoneChangeStateInfoActivity , a Z b k d e x q _ g b _ f a Z d j u l
] Z l _ v e u o f _ l h ^ h \ convertCallStateToString() , convertNetworkTypeToString() ,
con vertDataActivityToString() , convertDataConnStateToString() b
convertPhoneTypeToString() , d h l h j u Z _ g Z e h] b q g u f _ l h ^ Z f b 3.3, i e j b ^ k l b
k l Z \ e _ g k l b e g 3.6.

E b k l b g.j6. N Z c e d e Z k k Z hid b g Z h ` _ g b PhoneChangeStateInfoActivity .java

```
package com.samples.      telephony.phonechangestateinfo;

import android.app.Activity;
import android.content.Context;
import android.os.Bundle;
import android.telephony.PhoneStateListener;
import android.telephony.ServiceState;
import android.telephony.TelephonyManager;
import an     droid.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.widget.TextView;

public class PhoneChangeSta          teInfoActivity extends Activity
            implements OnClickListener {
        private TextView text;
        private       TelephonyManager manager;

        //    hij_^_ey_f h[jZ[hlqbdb kh[ulbc baf_g_gbc khklhygby k_lb
        private PhoneStateListener listener = new PhoneStateListener() {
                @Override
                public void onCallStateChanged(
                                final int state, fi                nal String incomingNumber) {
                        text.append("       \ nCall state:        \ t" +
                                convertCallStateToString(state) + "                    \ nIncoming number:      \ t");
                }

                @Override
                public void onDataConnectionStateChanged(
                                in  t state, int networkType) {
                        text.append("       \ nNetwork Type:     \ t" +
                                convertNet     workTypeToString(networkType));
                }
                @Override
                public void onCallForwardingIndicatorChanged(boolean cfi) {
                        text.append("       \ nCallForwardingIndicator:             \ t" + cfi);
                }

                @Override
                public void         onDataActivity(int direction) {
                        text.append("       \ nDataActivity:        \ t" +
                                        convertDataActivityToString(direction));
                }

                @Override
                public void         onDataConnectionStateChanged(int state) {
                        text.append("       \ nDataConnectionState:        \ t" +
                                        convertDataConnStateToString(state));
                }

                @Override
                public void         onMessageWaitingIndicatorChanged(boolean mwi) {
```

```
            text.append("\nMessageWaitingIndicator:\t" + mwi);
        }

        @Override
        public void onServiceStateChanged(ServiceState serviceState) {
            text.append("\nService State:\t" +
                    convertServiceStateToString(serviceState.getState()));
        }
    };

    @Override
    public void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);
        this.setContentView(R.layout.main);

        Button bStart = (Button)findViewById(R.id.bStart);
        Button bStop = (Button)findViewById(R.id.bStop);
        text = (TextView)findViewById(R.id.text);
        bStart.setOnClickListener(this);
        bStop.setOnClickListener(this);

        khaZ_f wda_fieTelephonyManager
        manager = (TelephonyManager)getSystemService(
                Context.TELEPHONY_SERVICE);
    }

    @Override
    public void onClick(View v) {
        switch (v.getId()) {
        case R.id.bStart:
            // j_]bkljbjm_f kemrZl_e_c kh[ulbc
            manager.listen(listener,
                    PhoneStateListener.LISTEN_CALL_STATE |
                    PhoneStateListener.LISTEN_CALL_FORWARDING_INDICATOR |
                    PhoneStateListener.LISTEN_DATA_ACTIVITY |
                    PhoneStateListener.LISTEN_DATA_CONNECTION_STATE |
                    PhoneStateListener.LISTEN_MESSAGE_WAITING_INDICATOR |
                    PhoneStateListener.LISTEN_SERVICE_STATE);
            text.setText("Start phone info listener...");
            break;

        case R.id.bStop:
            hklZgZ\eb\Z_f ijhkemrb\Zgb_ kh[ulbc
            manager.listen(listener,
                    PhoneStateListener.LISTEN_NONE);
            text.setText("Listener is stopped");
            break;
        }
    }

    \kihfh]Zl_evguc f_lh^ ^ey dhg\_jlZ\ServiceState \kljhdm
    private String convertServiceStateToString(int serviceState) {
        switch (serviceState) {
```

```
            case Service      State.STATE_EMERGENCY_ONLY:
                return "Emergensy Only";
            case ServiceState.STATE_IN_SERVICE:
                return "In Service";
            case ServiceState.STATE_OUT_OF_SERVICE:
                return "Out of Service";
            case ServiceState.STA         TE_POWER_OFF:
                return "Power OFF";
            default:
                return "Not defined";
            }
        }
        . ..
}
```

Kdhfibebjmcl_ b aZimklbl_ ijbeh`_gb_ gZ wfmeylh ijbeh_gby ij_^klZ\e_g.3.4gZ jbk

Jbk 4. GZqZeh jZ[hlu ijbeh`_gby
^ey ijhkemrb\Zgby baf_g_gby khklhygbc k_lb

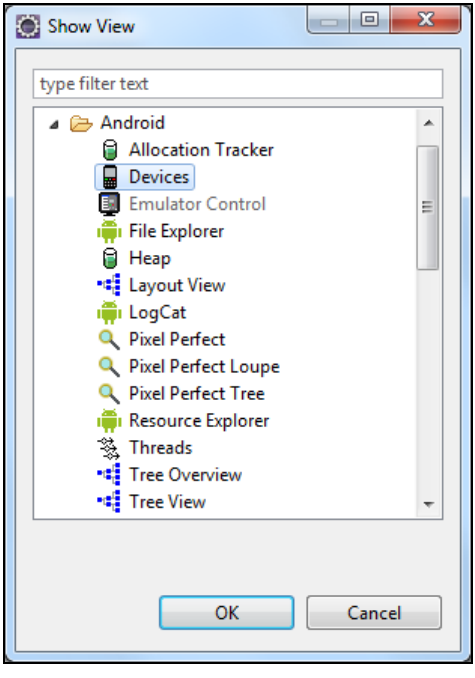
Ijb aZimkd_ ijbeh`_gb_ gZoh^blky \ khklhygbb ihd g_gby khklhygby khlh\hc k_lb >ey aZimkdZ ijhkeZm `Zlv dgh Start m

H^gZdhgbl daZ_l \hijhk dZd hleZ`b\Zlv b l_klbjh\?Zl <_^v \u `_ g_ [m^_l_ oh^blv k fh[bevguf l_e_nhgha f i f_g_gby oZ jZ bl_jkhlh\hc H k_ l_ ab u\Z_ glZ kylv jZ[hlu ih l_klb lZdhc nmgdpbhgZevghklb fhh`gohh^ky^_heZdlv fig x l_jZ >ey gby lZdh]h ijbeh`_gby gZfgkhjln f[mlvk Debug Monitor Server

Bkihevah\Zgb_ wfmeylhjZ ^ey l_klbjh\Zg ijbeh`_gbc

Ijb jZajZ[hld_ ijbeh`_gbc ^ey l_evgh ^ey hle_Zk\bjh\Zgby ijh]jZffu bkihevah\Zlv j_Zmkljhckl\h Wfmeylhj Android Dalvik Debug Monitor Server ij_^hklZ\eylj_[m_fmx nmgdpbhgZevghklv TelephonyManager k kh\k_f g_-h[

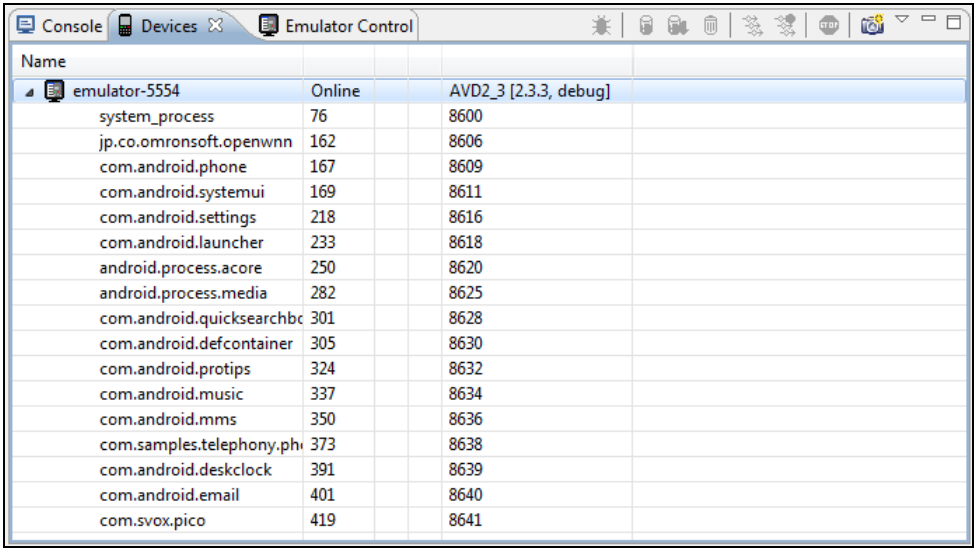
AZimkl DDMS fh`gh gZijyfmx ba Android SDK (ih^dZlZe tools\ddmsbat) beb ba Eclipse (dhg_qgh m \Zk ^he`_g [ulv ml ADT). < kj_^_ Eclipse gZ^h hldjulv Window | Show View | Other b\u[jZlv hipb Devices b Emulator Control (jbk 3.5).



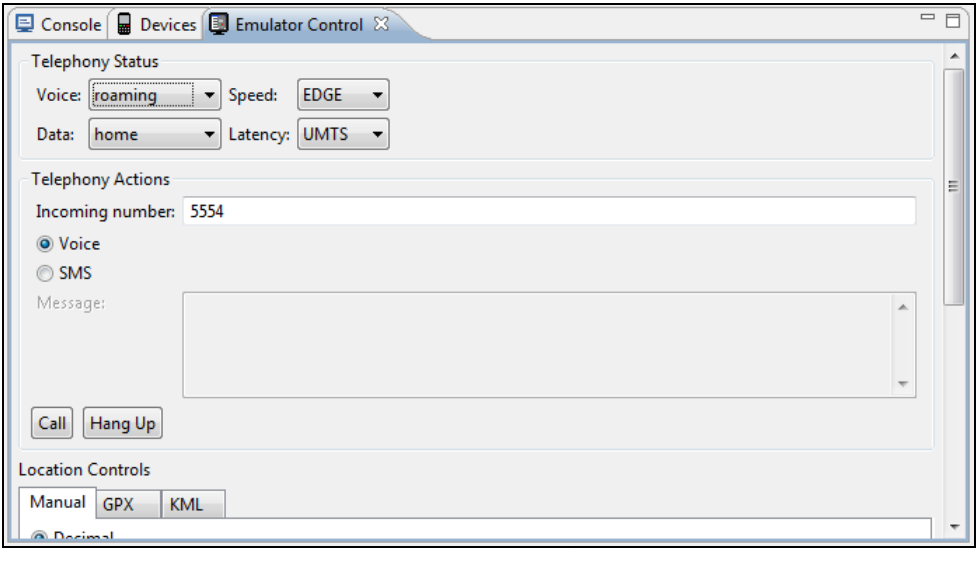
Jbk 5. Hldjulv ij_^klZ\e_gbc Devices b Emulator Control \ IDE Eclipse

Ij_^klZ\e_gbc Devices hlh[jZ`Z_l aZims_gguc wfmeylhjZ bo fh`g aZims_gh g_kdhevdh wda_fieyjh\ wfmeylhjZ bo fh`g q_j_a dhlhjuc wfmeylhj DDMS. GZ_flkyiZjlhlh[jZ`Z_lky \ eh\d_ hdgZ aZims_ggh]h wda_fieyjZ wfmeylhjZ GZij AVD \ aZ]heh\d_ hdgZ [m554 AVD. ^ ibjkv_ lh]h ghf_j hlh[jZ`Z_l Devices dZd ihdZaZgbk 36. gZ jbk

>ey mijZ\e_gby wfmeylhjkf bjkh\Zl Emulator Control. K _]h ihfhsvx fh`gh fh^_ebjh\Zlv jZaebqgu_ khklhygl b ^_ckl\by ihevah\Zl_ey Emulator Control b ^\ kj_^_ (FiQ_4S \ klZ\e_g gZ 37 jbk



Jbk 6. Ij_^klZ\e_gb_ Devices

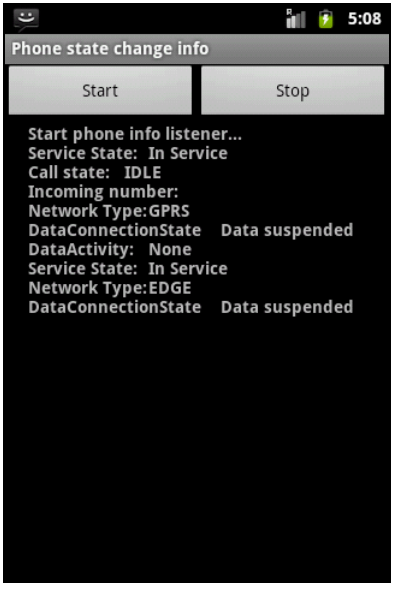


Jbk3.7. Ij_^klZ\e_gb_ Emulator Control

Ij_^klZ\e_gb_ Emulator Control khl^_j`bl ljb iZg_eb

- Telephony Status² bafg_gb_ khklhygby fh[bevgh^_mkl\ZgbjZaebqguo lbih\ k_lb *356 ('*^(8706 bl
- Telephony Actions ² \uiheg_gb_ fh^_ebjm_fuo h[jZs_gb b khh[s_gbc 606 d wfmeylhjm
- Location Controls ² fh^_ebjZgb_klhihehylgbe_nhgZ jZ[hl-m ihehylgb_f fu jZkkfhZ[khl\ldgbb

>ey mklZgh\e_gcbjZ[h\lyZxbs bf wdyajhfiewfmeylhjZ g_h[c
l_dklh\h_ Incoming number _klb ghf_j ihjlZ wlh]h(554)me
L_i_jv fh`gh ijhl_klbjh\Zlv gZr_ ijbeh`_gbb Emulator Control
AZimklbl_ \ ijbeh`_gbb fhgblhjbg] baf_g_gbc khklhy
dghidh Start. Ijbeh`_gb_ \u_^_l l_dmsmx bgnhjfZpbx h
k_lb dZd ihdZaZ8.h gZ jbk

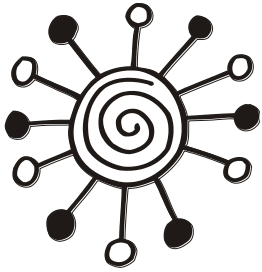


Jbk 8. l_j_o\Zl ijbeh`_gb_f baf_g_gby klZlmkZ k_lb

AZl_\fij_^klZ\e_gbb Emulator Control \iZg_ Telephony Status ihijh[mcl
ihf_ylv agZq_gby \ \uiZ^ZxVoice, Data, Speed, Latency kfjbk3.7).
Ijbeh`_gb_ ^he`gh j_Z]bjh\Zlv gZ baf_g_gb_ khklhyg
bgnhjfZpbx gZ wdjZg_

J_axf_

< wlhc]eZ_ fu jZkkfhlj_eb ijh]jZffguc ^hklmi d [Z
TelephonyManager ^ey ihemq_gby bgnhjfZpbb h khklhygbb
\hc k\yab LZd`_ fu gZmqbebkv j_Z]bjh\Zlv \ ijh]jZff
k_lb h\hc k\yab b khklhygby l_e_nhgZ
< ke_^mxs_c]eZ_ fu jZkkfhljbf \hafh`ghklbyS MSjZ
khh[s_gbc gZijyfmx ba gZr_]h ijbeh`_gby



=eZ\4Z

H[jZ[hldZ l_e_nhgguo \uah\h\

IeZlnhjfZ Android ij_^hklZ\ey_l ihevah\Zl_evkdbf ijbeh`
nmgdpbhgZevghklv ^ey mijZ\e_gby b hlke_`b\Zgby \
nhgguo \uah\h\ GZijbf_j ijbeh`_gb_ fh`_l Z\lhfZlbd
hij_^_e_ggh]h Z[hg_glZ beb knhjfbjh\Zlv]jmiim gu
ah\ \ j_`bf_ dhgn_j_gpbb Fh`gh lZd`_ kha^Z\Zlv k
\hf j_`bf_ dhlhju_ [m^ml hlke_`b\Zlv \oh^ysb_ b b
\u b khojZgylv wlm bgnihjfZ b\Z^_eyy

< wlhc]eZ_ fu aZcf_fky kha^Zgb_f l_e_nhgguo \u
ijh]jZffgh]h dh^Z ijbeh`_gby k bkihevah\Zgb_f kb
^hklZ\ey_l eZ\ nhjfZ Android.

Bkihevah\Zgb_ wfmeylhjZ klbjh\Zgby h[jZ[hldb l_e_nhgguo \uah\h\

Ijb jZajZ[hld_ ijbeh`_gbc ^ey jZ[hlu \ \oh^ysbfb- b
gufb \uah\Zfb kh\k_f g_h[yaZl_evgh ^ey hleZ^db b
bkihevah\Zlv j_Zevgh_ fh[bevgh_ mkjhckl\Z kms_kl\mxl: ^\Z kihkh[Z
gZf_gh[oh^bfmx nmgdpbhgZevghklv

>ey bfblZpbb \oh^ysbo b bkoh^ysbo a\hgdh\ \
mkljhckl\Z kms_kl\mxl: ^\Z kihkh[Z

^ bfblZpby l_e_nhggh]h \uah\h\ DDMS
^ bfblZpby l_e_nhggh]h \uah\h\ Android

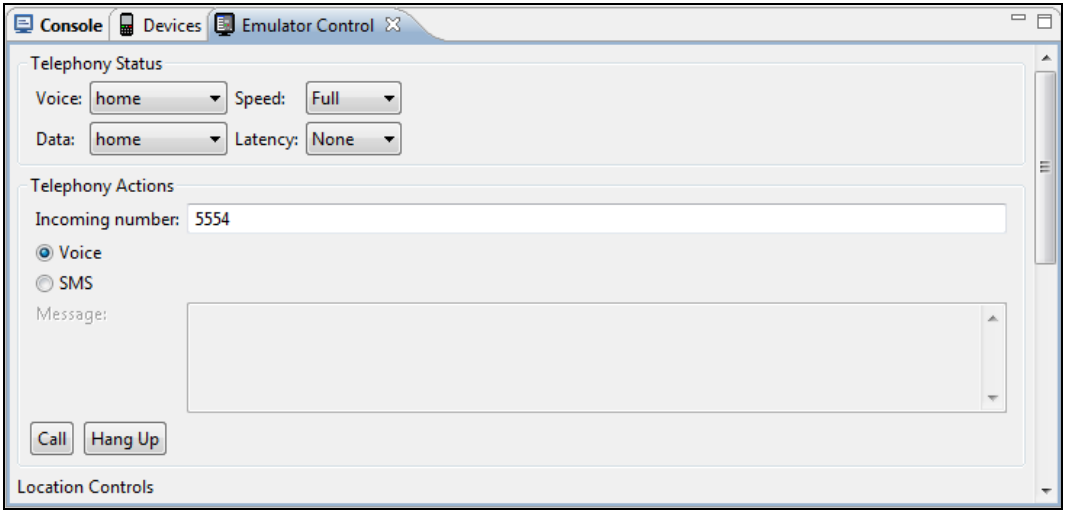
Wlb \hfh`ghklb wfmeylhjZ DDMS ijb]h^ylky gZf ijb jZa
ijbeh`_gbc jZ[hlZxsbo k l_e_nhgguo \uah\Zfb

BfblZpby l_e_nhggh]h \uah\h\ DDMS

< ij_^u^ms_c]eZ_ fu m`_ DDMS ^ey hlZf_gby khklhyg
[bevghc kgZbh]bqgh ^ey jZ[hlu k h[uqgufb l_e_nhgg
bkihevah\Zlv kihkh[u hibkZggu_ \ ij_^u^ms_c]eZ_

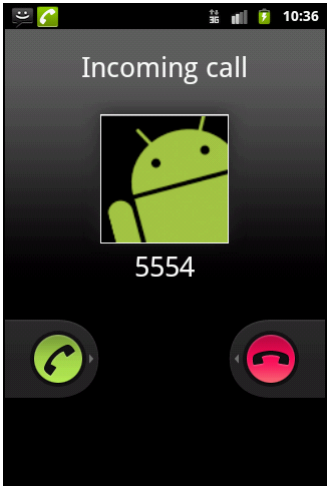
Qlh[u ihkeZlv \uah\ ^hklZlhqgh mklZgh\blv k\ey wjhkf
wfmeylhjZ q_j_a ij_^ekZ\ Eclipse aZl_f i_j_clk\Zlv ij_^b

Emulator Control. > Z e _ _ \ ] j Telephony Actions \ l _ d k l h \ h f Incoming number \ \ _ k l b g h f _ j i h j l Z a Z i m s _ g g h] h w d a _ f i e y j w f m e y l h j Z \ u a h \ d h Z d Z a i Z g h g Z . j b k Voice ` b g g b Z _ ` Z l v d g h l i j l m k Call Hang Up (jbk.1).



Jbk .1. B f b l Z p b y l _ e _ n h g g h] h Eclipse Z b a

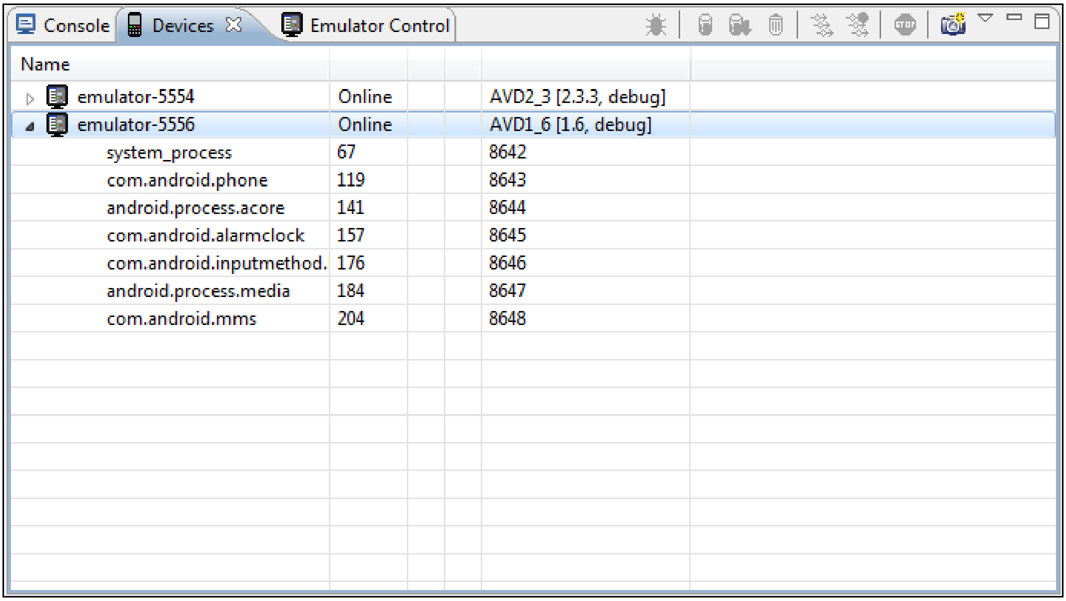
< j _ a m e v l Z l _ g Z r a Z i m s _ g g u c w d a _ f i e y j w f m e y l h j Z \ u a h \ d h Z d Z a i Z g h g Z . j b k (jbk.2).



Jbk .2. < o h ^ y s b c a \ h g h d l \ h j _ Android

BfblZpby l_e_nhggh]h \uah\Z f_`^m ^\mfy wfmeylhjZfb Android

>ey bfblZpbb l_e_nhgguo \uah\h\ f_`^m ^\mfy wfmeylhjZfb Android aZimkly ^\Z wfmeylhjZ. AZims_ggu_ wda_fieyju \ kj_^_ Eclipse \ ij_^kl Devices \u]eyZl ihdZaZgh gZ jbk. 4.3.



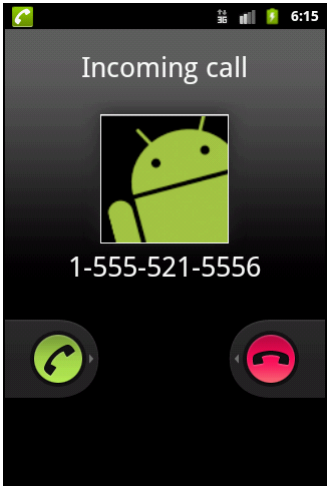
Jbk. 4.3. AZims_ggu_ wda_fieyju wfmeylhjh\ Android \ hdg_ Devices

DZd \u m`_ \b^_eb, dZ`^hfm bgklZgkm wfmeylhjZ ^heb_g ihjl. GZijbf_j, _kebb wfmeylhj lh ih mfheqZgbx _]h Z[hg_glkdbc ghf_j ^hf_g nhjfbjhmxl^hf ihjl\l gh ihjlZf wda_fiey Android Virtual Device, dZ`^hfm gh\hfm \bjlmZevghfm mkljhckl\m [m^_l ijbk\h_g ghf_jhf m_ebq_ggZ gZ 2.

DZ`^uc aZims_gguc wda_fieyj Android fh`_l [ulv bkihevah\Zg ihjlh\ ^ey dhgkheb Android Debug Bridge (bgkljmf_glZ ^ey eZ^db ijbeh`_gbc Android \oh^ys_]h \ ADK). Wlh hagZqZ_l, qlh dhgkhev i_j\h]h wfmeylhjZ aZims_ggh]h gZ ihjlc ghf_j 5554 bkihevam_l ihjl Android Debug Bridge.

Ke_^mxsb_ aZims_ggu_ wda_fieyju Android [m^ml bkihevah\Zlv ihjlu 5556 b 5558 b lZd ^Ze__. GZijbf_j, i_j\uc wfmeylhjZ bkihevam_l ihjlu 5554 b 5555, \lhjhc wda_fieyjZ wfmeylhjZ iZju ihjlh\ bl ^. <k_]h fh`gh aZimklblv ^h 16 wda_fieyjh\ wfmeylhjZ \ ih^ ihjlh\ _keb o\ZlbL ^ iZfylb gZ fZrbg_

GZijbf_j fu ohlbf bgbpbZebabjb\ ZlaV\hlgkhdh^bya wf
k ghf_jhf gZ wfmeylhj >ey wlh]h hldju\Z_f g
gZ[hjZ ghf_jZ \\h^bf ghf_j ihjlZ \uau\²Z_fh]hb w^fmeZ
\uah\ ljb wlhf gZ wfmeylhj ihklmibl \oh^ysbc a\h
DklZlb h[jZlbl_b \gZ bfgZhf_j Z[hg_glZ \oh^yisb_ih_j\ukauhe
d g_fm ^h[Z\ey_lky1-555-521-5556 k^ey bfblZpbb gZklhys_]
Z[hg_glZ dZd ihdZ4aZ gh gZ jbk



Jbk 4. <oh^ysbc a\hghd \ wfmeylhj_ ihemq_gb\ 556c ba wfme

LZdZy kbfmeypby l_e_nhgguo \ ihemq_gb\ Zfwfmeylhj_ l k
l_kbjh\Zgby ijbeh`_gbc dhlhju_ fu [m^_f jZajZ[Zlu\Zl

MklZgh\dZ jZaj_r_gbc

< ijbeh`_gbb dhlhjh_ ijh]jZffgh kha^Z_l beb i_ju_o\
ah\u `ghm lZd`_ aZ^Z\Zlv jZaj_r_gby >Ze__ i_rj_gbc
lj_[m_fuo ^ey ijbeh`_gbb dhlhjh_ ihemq_gb\ jZ[hlZlv k l_e_nhggufb

- CALL_PHONE² jZaj_rZ_l ijbeh`_gbx bgbpbZebaZpbx l_e_
  ih^l_j`^_gbey ihevah\Zl_ey
- CALL_PRIVILEGED ² jZaj_rZ_l ijbeh`_gbx bgbpbZebaZpb
  \uah\Z ex[h]h ghf_jZ\uah\ xwZklj_gguo kem`[[_a i
  ihevah\Zl_ey
- PROCESS_OUTGOING_CALLS ² jZaj_rZ_l ijbeh`_gbx ihemq_gb\ l
  BroadcastIntent ijb bgbpbZebaZpbb ihevah\Zl_e_f bkoh^y
- READ_PHONE_STATE ² jZaj_rZ_l ijbeh`_gbx ihemqZlv ^hklm
  hkhklhygbb l_e_nhgZ jZaj_r_gbb fu m`_ bkihevah\Zeb \ ij_
- MODIFY_PHONE_STATE ² jZaj_rZ_l ijbeh`_gbx fh^bnbpbjh\Z
  l_e_nhgZ

GZijbf_jqlh[u ijbeh`fhgbh ijhba\h^elv nhgguo \uah\Z[hg_gl
badh^Zg_h[bfh^ ^h[Z\blv jZaic CALL_PHONE \ nZce fZgbn_klZ
`_gby AndroidManifest.xml:

```
<uses - permission android:name="android.permission.CALL_PHONE" />
```

< aZ\bkbfhklb hl nmgdpbc \uihegy_fuo ijbeh`_gby_
gh\if_ggh g_kdih_ejvdbke_jZaujo_r_gbc

Bkihevah\Zgb_ h[t Intent h\ ^ey kha^Zgby l_e_nhgguo \uah\h\

Ijbeh`_gby Android kihkh[gu kha^Z\Zlv l_e_nhggu_ \uah\
ijZ\dbua\h\Z Z[hg_glm g_h[oh^bfh aZimklblv hdgh gZ
ba ijbeh`_gby \uah\ Z[hga\hl^Zbldky ijhuah\ wlh]h hdgZ
h[uqguf kihkh[hf q_jZ Intent h[t_dlZ Intent ^ey wlbo p_em_c
kfhlj_g gZ[hj ^_ckl^\be_ghgjuc ke_^mxsbfb :dhgklZglZfb
^ ACTION_DIAL; ^ ACTION_CALL; ^ ACTION_CALL_BUTTON

?keb \ dh^_ ijbeh`_gby lj_[m_lky ijhklh \ua\Zlv h
k gZ[hjgufb dghidZfb bkihevah\Zgb_ ACTION_CALL_BUTTON kl\b gZijbf_
ke_^mxsbjZ ahf

```
Intent intent = new Intent (Intent.ACTION_CALL_BUTTON);
startActivity (intent);
```

< j_amevlZl_ gZ wdjZg fh[bevgh]h mkljhckl\Z [mh^_
f_jZ hdZaZggZy 4 5 jbk

Jbk 5. <uah\ klZg^Zjlghc iZg_eb gZ[hjZ ghf_jZ

Ijb bkihevah\Zgb_ ACTION_CALL_BUTTON gZ[hj ghf_jZ b \uah\ Z\lh
g_ ijhba\h^ylky ihevah\Zl_ex g_h[oh^bfh _klb gh
klhyl_evgh H^gZdh ^_ ^jm]b_ dhgklZglu bf_xl [vhe
ghklv dhlhjmkkffhuljjbZf ^Ze__

<uah\l_e_nhggh]Z[hg_glZ ijbeh`_gby

K ihfhsvx ^_cAhbhc ACTION_DIAL bACTION_CALL fh`gh \uau\Zlv dhgd l_enhggh]h Z[hg_glZ i_j_^Z\Zy \ dhgklj\mdlZhj_dkhZ_ kk iZjZf_ljZ ^hiheg_gby lhfe_jnZhgu_glZ

KZfExtra-iZjZf_lj ^eydhZhtent ² g_ ijhklh l_e_nhggucctgh _dURI, bf_xsbc ke_^mxsbc nhjfZl

WHO ghf_jBZ[hg_glZ

LZdbf h[jZahf qlh[u bgbpbbjh\Zlv bkoh^ysbc a\hgh ijbeh`_gby gZ^h khaURZkv ahZ[tZdghc kljmdlmjhc b ig_j_ kljmldj ht_dlZ Intent gZijbf_j ke_^mxsbf h[jZahf

```
String phoneNum =        " 5554 "
Uri uri = Uri.parse("tel:" +                phoneNum);
Intent intent =          new Intent(Intent.ACTI          ON_DIAL, uri    );
startActivity(          intent);
```

K_cqZk fu ihijh[m_f k^_eZlv wlh \ ijbeh`_gby ^ Android b aZihegbl_ khhl_lkl\mxsb_ ihey New Android Project:

- Project name: PhoneCall;
- Application name: Phone Call;
- Package name: com.samples.telephony.phonecall
- Create Activity: PhoneCallActivity

lJBF?Q:GB?

Iheguc ^dhijbeh`_gby gZoh^blky gZ ijbeZ]Z_fhf-dbkg]\ dZ Ch04_PhoneCall.

< nZce fZgbn_klZ gm`gh h[yaZl_evgh ^h android.permission.CALL_ PHONE ^eyh[_ki_q_gbyafh`ghkl be_nhggl \uah\Z Z[hg_glZ ba ijbeh`_gby Z ijZce` fZgbn_klZ AndroidManifest.xml ij_^klZ\e_g \g]e_bklb

EbklbZ]. NZce fZgbn_klZ ijbeh`_gby AndroidManifest .xml

```
<?xml version="1.0" encoding="utf          - 8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
        package="com.samples.t       elephony.phonecall"
        android:versionCode="1"
        android:versionName="1.0">
    <application android:icon="@drawable/icon"
            android  : label   ="@string    / app_name">
        <activity android:name=".PhoneCallActivity"
                    android:lab      el="@string/app_name">
            <intent    - filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
```

```
            </intent - filter>
        </activity>

    </app lication>

    <uses - permission android:name="android.permission.CALL_PHONE" />
</ manifest >
```

< nZce_ dhfihgh\db]e\ZZ\ng\xml ijbehg`Z_gby kha^Z EditView ihe
^ey \\h^Z l_e_nhggh]h ghf_jZ b dghidCall \uah\h\ Zinkdg\Z
jhfbCall NZce dhfihgh\db hdgZ ijbeh`_gbyg]j 4.2.klZ\e_g

Ebklbg 4.2. NZce dhfihgh\db hdgZ ijbeh`_gby main.xml

```
<?xml version="1.0" encoding="utf - 8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent">

    <LinearLayout
        android:orientation="horizontal"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content">
        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Number:"/>
        <EditText android:id="@+id/textNumber"
            android:layout_width="fill_parent"
            andr oid:layout_height="wrap_content"
            android:cursorVisible="true"
            android:editable="true"
            android:singleLine="true"/>
    </LinearLayout>

    <Button android:id="@+id/bCall"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text="Call"/>

</LinearLayout>
```

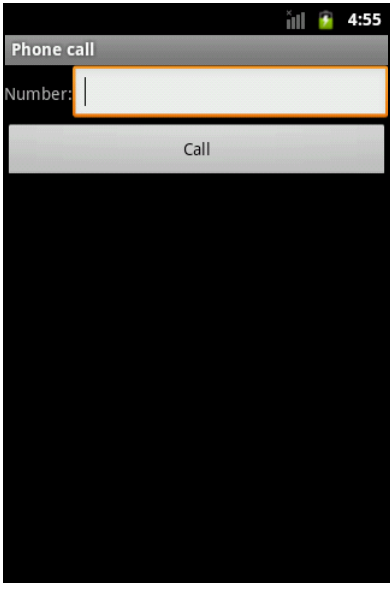
< dh^_ dhZkkZ CallActivity ijbeh`_gby \ h[jZ[hlqbd_ kh[u
dghidhC onClick() [m^_l kha^Z\Zlvkty intent h[kExtra iZjZf_ljhfkh^Zj`
sbfURI _^_ggh]h \ l_dklh\h_ZiZ[e_g_ggh]fZ_j
Dh^ dhZkkZ CallActivity ij_^klZ\e_g \ eb3klbg]_

E b k l b g 4.3. N Z c e h d g Z j b e h ` _ g b PhoneCallActivity .java

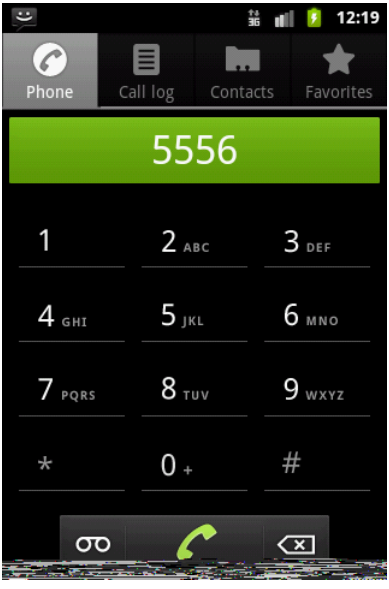
```
package com.samples.telephony.phonecall;

import android.app.Activity;
import android.content.Intent;
import android.net.Uri;
import android.os.Bundle;
import android.view.View;
import android.vi          ew.View.OnClickListener;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;

public class PhoneCallActivity
            extends Activity implements OnClickListener                    {

        private EditText textNumber;
        private Button          bCall;

        @Override
        public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);

                textNumber=(EditText)findViewById(R.id.textNumber);
                bCall = (Button)findViewById              (R.id.bCall);

                bCall.setOnClickListener(this);
        }

        @Override
        public void onClick(View arg0) {
                try {
                        K h a ^ Z _ f  h [ t _ d U R I
                Uri uri = Uri.parse("tel:" + textNu                    mber.getText().toString());

                        k h a ^ Z _ f  h [ t _ d I n t e n t    b  \ u a u \ Z _ A c t i v i t y    ²  g Z [ h j g m x  i Z g _ e v
                startActivity(new Intent(Intent.ACTION_DIAL, uri));
                }
                catch (Exception e) {
                        Toast.makeText(this, e.toString(), Toast.LENGTH_LONG).show();
                }
        }
}
```

Kdhfibebjmcl_ ijh_dl b aZ[ZwkhbeylAnjlhoid <g_rgbc ijbeh`gby ij_^klZ\e_g4.6gZ jbk

L_i_jv ijhl_klbjm_f gZr_ ijbeh`_gb_ >ey wlh]h aZ wfmehyZ ?fm [m^_l ijbk\h_g ghf_j ihjlZ L_ihjv_]Z gZr_]h ijbeh`_gby_"\Z[h^bl'kdghf_j \lhjh]h wfmeylhj_ Android (5556) b gZ`fbl_ dgalidmjb wlhwfmeylhj_ ^he`gh ihy\blvky [hjghc iZg_eb k _^_g:5556 gh dZ_jhiZgdhZ aZ 4.7.k



Jbk 6. Ijbeh`_gb_ ^ey kha^Zg bkoh^ys_]h \uah\Z



Jbk 7. AZ]jmadZ \uah\Z Z[hg_ \ hdg_[ijghc iZg_eb

KZf \uah\ ijb bkihevah\Z ACTION_DIAL ^he`_g kZf gZ`Zlv dghidm \uah\Z bgZqghZ[ijbgbc bZ`ihy\Z sbc a\hghd Ijb \uah\_ Z[hg_glZ gZwfmehyZ Android ^he`gh ihy\blvky hdgh hih_s_gby h \oh^ys_f a\h4.4d_ lZ

Qlh[u ijhba_klb l_e_nhgguc \uah\ ba ijbeh`_gby [fh[bevgh]h mkljhckl\Z bkihevah\Z ACTION_CALL >ey wlh]h \ ijb gbb baf_gbl_ dh^ \ h[jZ[hqbcl_ ijhl_klbjm_f aZf_gb\ \hdh j_ h[t_dlZ agZq_ghb_ Intent.ACTION_DIAL gZ agZq_ghb_ Intent.ACTION_CALL , dZd ihdZaZgbq] \4.4.bklb

Ebklbg.4. H[jZ[hlqbd kh[udhCl onClick() deZkl PhoneCallActivity

```
@Override
public void onClick(View arg0) {
    try {
    Uri uri = Uri.parse("tel:" + textNumber.getText().toString());
```