

http://www.android.com/



Mobile development Android overview

Globally by the end of 2010 there will be 5.1 billion mobile subscriptions That represents about 2 mobile subscriptions for every 3 people in the world

Vendor	2010 Unit Shipments	2010 Market Share	2009 Unit Shipments	2009 Market Share	Year-over- year Change
Nokia	453.0	32.6%	431.8	36.9%	4.9%
Samsung	280.2	20.2%	227.2	19.4%	23.3%
LG Electronics	116.7	8.4%	117.9	10.1%	-1.0%
ZTE	51.8	3.7%	26.7	2.3%	94.0%
Apple	47.5	3.4%	25.1	2.1%	89.2%
Others	439.4	31.6%	342.9	29.3%	28.1%
Total	1388.6	100.0%	1171.6	100.0%	18.5%

Total PC shipments in 2010, 346.2 million In Q4 2010 it shipped 101 million smart phones All shipments numbers are in million units according to International Data Corporation (IDC)



Market shares of smartphone Platforms

According to the CEO of the Swedish operator Telia Sonera In quarter 4 - 2010 were 90% of all mobile phones sold a smartphone!



http://www.dagensmedia.se/nyheter/dig/article3081018.ece

Todays mobile "tele-puters"

- Sophisticeted
 - Have capacity and functionality as a desktop computer (view the Mozilla Seabird movie or Motorola ATRIX docks promo)
 - GPS and other sensor devices built in, voice recognition...
 - Low cost unlimited data-plan
 - TV (dvb-h/mbms, dmb/dab)
 - Pay services (NFC)
- Examples
 - 3rd party applications (apps)
 - Cloud computing services
 - Advanced communications
 - OpenGL ES etc.
 - Location Based Services
 - VoIP, speech to text, ...



Examples - LBS



GAMING Location-aware Interactive Gaming



NAVIGATION & POINTS OF INTEREST

Turn-by-turn Navigation City Guides Mobile Yellow Pages Traffic Reroute Weather



PERSONAL SECURITY

Roadside Assistance Child Finders GeoFencing Protection of Highrisk Personnel



PEER-TO-PEER Buddy Groups Dating Geo-marked Photo Sharing



ENTERPRISE Fleet Management Asset Monitoring Productivity









Mobile development 1

- Others
 - Java(2) ME
 - Microbrowser based
 - Flash (Lite)
 - Python
 - BREW

Platform	Language(s)	Remarks
Android	Java, C, C++	Open Source OS (based on Linux) developer.android.com
bada	C, C++	Samsung's mobile platform running on Linux or RealTime OS developer.bada.com
BlackBerry	Java, Web Apps	Java ME compatible, extensions enable tighter integration blackberry.com/developers
BlackBerry Tablet OS (QNX)	ActionScript, C++, HTML, CSS, JavaScript	Java announced blackberry.com/developers
iOS	Objective-C, C	Requires Apple Developer Account developer.apple.com/iphone
MeeGo	Qt, C++, others	Intel and Nokia guided open source OS (will be replaced by Tizen) meego.com/developers
Symbian	C, C++, Java, Qt, Web Apps, others	Currently the longest running of all smartphone OSs www.forum.nokia.com/symbian
web0S	HTML, CSS, JavaScript, C	Supports widget style programming, (based on Linux), probably dead since it has been abandoned by HP developer.palm.com
Windows Mobile	C#, C	.NET CF or Windows Mobile API, most devices ship with Java ME compatible JVM developer.windowsmobile.com
Windows Phone	C#, VB.NET	Silverlight, XNA frameworks create.msdn.com

Mobile development 2



Source: Mobile Developer Economics 2010 and Beyond. Produced by VisionMobile. Sponsored by Telefonica Developer Communities. June 2010. Licensed under Creative Commons Attribution 3.0 License. Any use or remix of this work must retain this notice.

Mobile Dev. 3

http://en.wikipedia.org/wiki/Mobile_programming for even more info

A very good read: "Mobile Developers Guide To The Galaxy"

http://www.enough.de/products/mobiledevelopers-guide/

Android compared to other development environments and platforms

Missing platforms HP - webOS



Green indicates good coverage or support, yellow for limited and red for bad coverage of the respective topic

What is Android?



- A free, open source mobile platform framework
- Android is not a device, or a product, or limited to phones
 - A hardware reference design describing the minimum requirements to support the stack
- Android brings Internet-style innovation and openness to mobile phones
- Contains a set of pre-installed key applications (a fully functioning smart phone)
- Software Development Kit (tools, plug-ins, and documentation)
- The online Android Dev Guide
 - http://developer.android.com/guide/

Android history



- July 2005, Google buy Android Inc. of Andy Rubin
- Jan 2007, Apple release Iphone with the help of Google
- Nov 2007, Open Handset Alliance is created
- Oct 2008, Android is open source (Apache license)
- Apr 2009, Android 1.5 (API level 3) Cupcake is released
- Sep 2009, Android 1.6 (API level 4) Donut is ...
- Jan 2010, Android 2.1 (API lelvel 7) Eclair is ...
- May 2010, Android 2.2 (API level 8) Froyo is ...
- Dec 2010, Android 2.3 (API level 9) Gingerbread is ...
- Feb 2011, Android 3.0 (API level 11) Honeycomb is ...
- Oct 2011, Android 4.0 (API level 14) Ice Cream Sandwich is released

Android tablets





Android version distribution and activations

There is around 190 million Android devices running in the world just now oct. 2011

It cost \$25 (one time fee) to publish Apps on the Android Market

Android 2.3 -

Android 2.2



http://developer.android.com/resources/dashboard/platform-versions.html

Android operating system 1 🏦 👮

- Android is a Linux based, multiprocess, multithreaded OS
 - By default each App runs in its own isolated process with its own Java Virtual Machine
 - Each App is assigned a unique Linux user ID
 - Apps (tasks) can share the same user ID to see each other's files and share the same VM
- Open source libraries
- Android run time environment
 - The DVM (Dalvik Virtual Machine) uses APK (Android Package) files which are created in the DEX (Dalvik Executable) binary format
 - Register based instead of stack based VM with JIT support
- An application framework SDK with a Java 5 SE programming interface
 - Android NDK for native code (C/C++) via JNI (Java Native Interface)
- Some pre-installed key applications

http://developer.android.com/videos

Android application model 👚 🐔 👘





Android stack (architecture) 👘 🛒



Android operating system 2 攁

 Android-supported hardware shares some common features due to the nature of the operating system

- Phones, tablets, televisions, cars, cameras, ...?

- The Android OS is organized into the following images
 - Bootloader Initiates loading of the boot image during startup
 - Boot image Kernel and RAMdisk (root file system tree)
 - System image Android operating system platform and apps
 - Data image User data saved across power cycles
 - Recovery image Files used for rebuilding or updating the system
 - Radio image Files of the radio stack
- These images are stored on nonvolatile flash memory, so they are protected when the device powers down. The flash memory is used like read-only memory (hence, some call it ROM), but can it be rewritten as necessary. For example, with FOTA (Firmware Over-The-Air) Android operating system updates

"Old" generation phones



• A couple of popular phones, note that the ROM (Flash) is divided into several partitions (images) mounted in the RAMdisk tree

- System, data, etc.

Model	MPU	RAM/ ROM	Screen	Other Features
Samsung Galaxy S Pro (August 2010)	1-GHz Samsung Hummingbird	512MB/ 2GB	AMOLED 480x800 hdpi	CDMA/1xEV-DO, 802.16, FM radio slide out keyboard BT3.0, 802.11b/g/n, 5-MP camera 0.3MP front-facing camera, AGPS
Nexus One / HTC Passion (January 2010)	1-GHz QCOM Snapdragon	512MB/ 512MB	AMOLED 480x800 hdpi	GSM/UMTS Trackball, dual microphones BT2.0, 802.11a/b/g/n, 5-MP camera AGPS, geotagging

At least 5 MF of SoC

- Samsung
- Qualcomm
- Texas Instruments
- nVidia
- ST-Ericsson

"Current" generation of system-on-chip (SoC) boards

TI OMAP5430 SoC



User input methods



- Touch screens
 - Resisteive Two resistive material layers sit on top of a glass screen.When a finger, stylus, or any object applies pressure, the two layers touch together and the location of the touch can be determined
 - Capacitive A charged material layer is overlaid on a glass screen.When a finger or any conductive object touches the layer, some charge is drawn off, changing the capacitance, which is measured to determine the location of the touch.
 - Surface Acoustic Wave This uses a more advanced method that sends and receives ultrasonic waves
- Alternative methods
 - **D-pad** (directional pad) An up-down-right-left type of joystick
 - Trackball A rolling ball acting as a pointing device that is similar to a mouse
 - Trackpad A special rectangular surface acting as a pointing device
 - Keyboard As it sounds, a minimal keyboard for phones

Sensors in Android



- Apart from the obvious as microphone and one or two cameras most phones contain
- Three axis accelerometer to measure gravity
- Three axis magnometer to measure magnetic fields
- Temperature sensor for measuring ambient temperature
- GPS (Global Position System)
- Barometer (air pressure)
 - Increase the GPS performance and possibly predict weather
- Light sensor to optimize the display conserve energy
- Proximity sensor used when talking
- Gyroscope sensor to allow more accurate movement in 3D than an accelerometer
 - Allows the calculation of orientation and rotation





Java platforms



Android SDK classes

android.app(1)	andro	id1	android.co	ontent	android.view(1)	android.view.animation 1		android.widget		android.test(1)	android.test.mock(1)
letivity	Manifest	_	ComponentCollibs	reke	ContextMenu	aternolator.	Adapter	DatePicker Scr	oller	PerformanceTestCase	MockApplication
Letivity Group	P		Dialogiaterface		Menu	AsselerateDeselerateInternelator	Checkoble	DislarEiter Scr	ollView	TestSuiteDrouider	MockContentProvider
LetivityManager	n.		Entituiterator		Manultam	AccelerateDecelerateInterpolator	Evenedablel istådanter	DisitalClock Sa	Bar	ActivitulostrumentationTestCase	MorkContentResolver
larmManager	and sold and	and the second	ServiceConnecton		SubMenu	AlphaAnimation	Filterable	EditText Sin	oleådaoter	ActivityTestCase	MockContext
lertDialog	android.app	pwidget (3)	ShoredPreference	.	SurfaceHolder	Animation	FilterQueryProvider	ExpandableListView Sin	pleCursorAdapter	ActivityUnitTestCase	MockCursor
liasActivity	AppWidgetHost		SyncStatusObserv	er	ViewMonoper	AnimationSet -	HeterogeneousExpondableList	Filter Sin	pleCursorTreeAdapter	AndroidTestCase	MockDialogInterface
pplication	AppWidgetHost	View	AbstractThreaded	SyncAdapter	ViewParent	AnimationUtils	ListAdapter	FrameLavout Sin	pleExpandableListAdapter	AndroidTestRunner	MockPackageManager
DatePickerDialog	AppWidgetMan	ager	AsyncQueryHand	ler	WindowManager	AnticipateInterpolator	SectionIndexer	Gallery Slid	lingDrawer	ApplicationTestCase	MockResources
Dialog	AppWidgetProv	ider	BroadcastReceive	er 🔰	AbsSavedState	AnticipateOvershoptInterpolator	SpinnerAdopter	GridView Spi	nner	InstrumentationTestCase	
xpandableListActivity	AppWidgetProv	derinfo	ComponentName		ContextThemeWrapper	BounceInterpolator	WrapperListAdapter	HeaderViewListAdapter Tat	Host	InstrumentationTestRunner	android.test.suitebuilder(1
nstrumentation			ContentProvider	11	Display	CycleInterpolator	AbsListView	HorizontalScrollView Tai	leLayout	InstrumentationTestSuite	TestMethod
ntentService	android.pr	ovider(1)	GententProvider	lient	FocusFinder	DecelerateInterpolator	AbsoluteLayout	ImageButton Tai	leRow	IsolatedContext	TestSuiteBuilder
eyguard Manager	BaseColumns	\sim	GontentProvider	operation	GestureDetector	GridLayoutAnimationController	AbsSeekBar	ImageSwitcher Tai	Widget	MoreAsserts	
auncherActivity	OpenobleColum	ins	ContentProviderF	Result	Gravity	LayoutAnimationController	AbsSpinner	ImageView Tex	tSwitcher	ProviderTestCase	android.os(1)
istActivity	Browser		ContentQueryMa	p	HapticFeedbackConstants	unearinterpola or	Adepterview	LinearLayout Ter	tView	RenamingDelgatingContext	Ibioder
ocalActivityManager	CallLog		ContentResolver	-	KeyCharacterMap	OvershootInterpolator	AiphabetIndexer	ListView Tin	hePicker	ServiceTestCase	linterface
lotification	Contacts		ContentUris		KeyEvent	RotateAnimetion	AnalogClock	MediaController To:	est	SingleLaunchActivityTestCase	Parceloble
lotificationManager	ContactsContra	ct	ContentValues		Layoutinflater	ScaleAnimation	ArrayAdapter	MultiAutoCompleteTextView Top	gleButton	SyncBaseInstrumentation	AsyncTask
endingIntent	LiveFolders		Context		MenuInflater	Transformation	AutoCompleteTextView	PopupWindow Tw	oLineListItme	TouchUtils	BatteryManager
rogressDialog	MediaStore		ContextWrapper		MotionEvent	TranslateAnimation	BaseAdapter	ProgressBar Vic	eoView	ViewAsserts	Binder
earchableInfo	SearchRecentSu	ggestions	Entity		OrientationEventListener		BaseExpandableListAdapter	QuickContactBadge Vie	wAnimator	and wild and a second	Build
earchManager	Settings		Intent		OrientationListener	android.view.inputmethod(3)	Button	RadioButton Vie	wElipper	android.preference	ConditionVariable
ervice	SyncStateContra	act	IntentFilter		ScaleGestureDetector	InputConnection	CheckBox	KadioGroup Vie	wswitcher	CheckBoxPreference	CountDownTimer
abActivity	UserDictionary		IntentSender		SoundEffectConstants	inputMethod	CheckedTextView	Katingbar Zoo	mButton	DialogPreference	Debug
JiModeManager		-	MutableContextv	Vrapper	Surface	InputMethodSession	Chronometer	RelativeLayout 200	mauttonscontroller	EditTextPreference	DropBoxManager
Vallpaperinto	android.datab	ase.sqlite(1)	PeriodicSync	and the second s	SorfaceView	BaseInputConnection	CompoundButton	Remoteviews Zor	Controls	ListPreference	Environment
VallpaperManager	SOLiteCursorDri	ver	Searchkecentsug	gestionsProvider	TouchDelegate	CompletionInfo	CursorAdapter	KesourceLursorAdapter		Preference	FileObserver
	SOLiteDatabase	CurtorFactory	SyncAdapterType		Velocity/racker	EditorInfo	Cursor TreeAdapter	Resourcecursor reeadapter		RingtonePreference	Handler
android.database (1)	SQLiteTransacti	onListener	SyncLontext		ViewConfiguration	ExtractedText	and wild view assessmenthalling (a		id media	andraid webkit	Looper
rossProcessCursor	SQLiteClosable		Syncinto		ViewDebug	ExtractedTextRequest	android.view.accessibility(4	andro	id.media	android.weokit(1)	MemoryFile
lursor	SQLiteCursor		SuncState		ViewGroup	InputBinding	AccessibilityEventSource	AsyncPlayer	MediaPlayer	DownloadListener	Message
AbstractCursor	SQLiteDatabase		UriMatcher		ViewStub	InputConnectionWrapper	AccessibilityEvent	AudioFormat	MediaRecorder	PluginStub	MessageQueue
bstractWindowedCursor	SOLiteOpenhielp		Commercial		ViewTreeDbeerver	InputMethodInfo	AccessibilityManager	AudioManager	MediaScannerConnection	UrlinterceptHandler	Messenger
CharArrayBuffer	SQLiteProgram	CA	android.ac	counts(5)	Window	InputMethodManager		AudioRecord	Ringtone	VolueCallback	Parcel
ContentObservable	SQLiteQuery	JC	Arrought	Collbackella				AudioTrack	RingtoneManager	CacheManager	ParcelFileDescriptor
ContentObserver	SQLiteQueryBui	ider	Accountilianager	Eutoper V>	android.gesture(4)	android.location(1)	android.text.method(1)	CamcorderProfile	SoundPool	ConsoleMessage	ParcelUuid
lursorJoiner	SQLiteStatemen	it	OnAccounteilada	tel letener	Gesture	Locationi istener	Kewlistener	Exifinterface	ThumbnailUtils	CookieManager	PatternMatcher
ursarWindow		-	AbstractAccount	uthenticator	GestureLibraries	Address	MovementMethod	FaceDetector	ToneGenerator	CookieSyncManager	PowerManager
ursorWrapper	android.access	ibilityservice (4)	Account		GestureOverlavView	Criteria	TransformationMethod	JetPlayer		Datesorter	Process
DatabaseUtils	AccessibilitySen	vice	AccountAuthenti	catorActivity	GesturePoint	Geocoder	ArrowKeyMovementMethod		1	GeolocationPermissions	RecoverySystem
JataSetUbservable	AccessibilitySer	viceInfo	AccountAuthenti	catorResponse	GestureStore	GpsSatellite	BaseKeyListener	android.text(1)	android.text.style(1)	HttpAutnHandler	RemoteCallbackList
Jatasetudserver			AccountManager	1000 C 1000 C 1000	GestureStroke	GpsStatus	CharacterPickerDialog	Editable	AlignmentSpan	IsPromptkesuit	ResultReceiver
Alatrix Cursor	android.service	.wallpaper 7	AuthenticatorDes	cription	GestureUtils	Location	DateKeyListener	GetChars	LeadingMarginSpan	MineTureMan	States Cleak
heigeculsul	WallpaperServic	-			OrientedBoundingBox	LocationManager	DateTimeKeyListener	InputFilter	LineBockgroundSpan	Plutio	TokenWatcher
Public STR					Prediction	LocationProvider	DialerKeyListener	inputType	LineHeightSpan	PlusioData	Vibrator
android graph	nics(1)	android.grap	hics.drawable(1)	android.opengl			DigitsKeyListener	NoCopySpan	ParagraphStyle	Pluginlist	Violetoi
					android.hardware(1)	android,speech (3)	HideReturnsTransformationMet	thad ParcelableSpan	TabStopSpan	SsiFrrorHandler	
woidXferMode Pa	bint	Animotoble		EICI	SensorEventListener	RecognitionListener	LinkMovementMethod	Spannable	UpdateAppearance	UrlInterceptRegistry	android.util
sitmáp Pa	aintFlagsDrawFilter	RitmanDra	wable	CIDabualdala	SensorListener	RecognitionService	MetaKeyKeyListener	Spanned	UpdateLayout	URLUtil	AttributeSet
SitmapFactory Pa	ath	GlieDrawable	Die	GLDebugnelper	Camera	RecognizerIntent	MultiTapKeyListener	SponWotcher	WrapTagetherSpan	WebBackForwardList	Printer
sitmapshader Pa	sthDashPathEffect	ColorDrawable		GLESIU GLESIUE	GeomagneticField	SpeechRecognizer	NumberKeyListener	TextWatcher	AbsoluteSizeSpan	WebChromeClient	Base64
siuriviaskhilter Pa	stnemect	Desweble	-	CLESIOLAL	Sensor		PasswordTransformationMetho	d AlteredCharSequence	BackgroundColorSpan	WebHistoryItem	Base64InputStream
amend Pa	eture	DrawableCont	tainer	GLESTIEvt	SensorEvent	and ordinputmethodservice(3)	QwertykeyListener BeeleenmentTreesformerter	AndroidCharacter	BulletSpan	SebiconDatabase	Base64OutputStream
alivas Fi	uell'ermet	GradientDraw	able	GLESZO	SensorManager	AbstractInputMethodService	Replacement (ransformation/vie	Annotation	CharacterStyle	WebSettings	Config
ColorEilter Di	velVor/fermode	InsetDrawable		GLSurfaceView		ExtractEditText	Sindlel ineTransformation forthe	AutoText	ClickableSpan	WebStorage	DebugUtils
olorMetriv Dr	hint are mode	LaverDrawable		GLU	android.telephony(1)	InputMethodService	TavtKaulistanar	BoringLayout	UrawableMarginSpan	WebView	DisplayMetrics
ColorMetrixColorEilter_ Dr	hintE	LeveiListDraw	able	GLUtils	CellLocation	Keyboard	TimeKaulistener	ClipboardManager	DynamicDrawableSpan	WebViewClient	EventLog
omnoseDathEffert Dr	orterDuff	NinePatchDra	wable	Matrix	NeighboringCellInfo	KeyboardView	Touch	DynamicLayout	ForegroundLolorSpan	WebViewDatabase	EventLogTags
omposeShader R	orter DuffColorFilte	PaintDrawable	ICC	Visibility	PhoneNumberFormattingText		- Oden	Pitmi	Inconiviarginspan		FloatMath
ornerPathEffect		PictureDrawat	de la		Watcher	android.net(1)		Lagin Filmer	MaskEllasEeee	android.text.util	Log
DashPathEffect Pr	orterDuffXfermode	RotateDrawab			PhoneNumberUtils	ConnectivityManager	android.speech.tts(4)	Selection	MatricAffectionSpan		LogPrinter
DiscretePathEffect Ra	adialGradient	ScaleDrawable	•		PhoneStateListener	Credentials	TextToSpeech	SnannahleString	QuoteSpan	Diskity Diskata	MonthDisplayHelper
DrawFilter Ra	asterizer	ShapeDrawabl	le		ServiceState O 1011V	Dhepinfo		SpannableStringBuilder	RasterizerSpan	Rfc82210ken	Pair
mbossMaskFilter Re	ect	StateListDraw	able		SignalStrength	LocalServerSocket	android.net.http(1)	SpannedString	RelativeSizeSpan	Nicezzi okenizer	Patterns
mageFormat Re	ectF	TransitionDrav	wable		SmsManager	LocalSocket		StaticLayout	ReplacementSpan		PrintStreamPrinter
nterpolator Re	egion	- materia	ald area birs does at	la change	SmsMessage	LocalSocketAddress	AndroidHttpCient	TextPaint	ScaleXSpan		PrintWriterPrinter
ayerRasterizer Re	egionIterator	andro	oiu.graphics.orawab	ie.snapes(1)	TelephonyManager	MailTo	Silertificate	TextUtils	StrikethroughSpan	android.sax	SparseArray
ightingColorFilter Sh	nader	ArcShape				NetworkInfo	silrior		StyleSpan	Channed Light out	SparseBooleanArray
inearGradient Su	umPathEffect	OvalShape			android.bluetooth 5	Proxy	android.net.wifi	android.text.format(3)	SubscriptSpan	EndElementListener	SparseIntArray
MaskFilter Sv	weepGradient	PathShape			BluetoothAdapter	SSuCertificateSocketFactory	K K	and the second sec	SuperscriptSpan	EndTextElementListener	StateSet
Aatrix Ty	peface	RectShape			BluetoothClass	SSLSessionCache	scankesult	DateFormat	TextAppearanceSpan	StortElementListener	StringBuilderPrinter
Aovie Xf	ermode	RoundRectSha	ape		BluetoothDevice	rafficStat	Withon	Formatter	TypefaceSpan	TextElementListener	Timinal onser
VinePatch Yu	uvimage	Shape			BluetoothServerSocket	Un	Withdepager	Time	UnderlineSpan	Element	TunedValue
					BluetoothCocket	UnQuerysanitizer	tertimeneger	1000	LIPIScan		. then teine

Whats needed to develop? 🕂 🐔 👚

- The Android "tool chain"
 - Java SE JDK/JRE 5, 6, 7 (1.5.x 1.7.x) or newer
 - Android SDK and tools
 - Build, test and debug the Android applications
 - Eclipse IDE or other Java IDE
 - Eclipse IDE for Java Developers 3.7.x (Indigo)
 - Android Development Tools (ADT) plugin for Eclipse
- Debug certificate
 - [drive]:\Users\<username>\.android\debug.keystore
- Various other extra/special tools (not needed in our programming labs) as Ant, advanced testing tools etc.
 - Fastboot, Proguard, Hierarchy Viewer, etc.
 - Monkeyrunner for stress tests, TraceView for profiling etc.
- The first Android lab may have more info (system setup)

Android SDK and tools folders

- SDK Manager and AVD Manager
- The Android Emulator
 - A virtual implementation of an Android phone (QEMU)
 - AVD (Android Virtual Device)
- Dalvik Debug Monitoring Service (DDMS)
 - Manage and control the Apps, GPS, SMS, calls, etc.
 - LogCat (see logged messages), file explorer, etc.
- Android Debug Bridge (ADB)
 - Manage the state of an emulator instance or Android-powered device
 - Copy files, install compiled application packages, run shell commands etc.
- Traceview
 - Graphical analysis tool for viewing the trace logs from the Android application, i.e. debug your application and profile its performance
- SQLite command tool
- MkSDCard
 - Creates a SD Card disk image to be used for external storage
- Zipalign (done automatically by ADT in Eclipse)
 - Optimize the created and signed .apk file, aligning the bytes to 4



Eclipse with Android SDK - Java 1 🕺 🔶

Java - SimpleTracker/src/se/du/simpletracker/SMS.ja	ava -	Eclipse					
<u>File Edit Source Navigate Search Project Re</u>	fac <u>t</u> o	r <u>R</u> un	<u>W</u> indow <u>H</u> elp				
C1 • R1 • R & R & R & R & R & R & R & R & R & R	G	* 🎋	• • • • • • • • • • • • • • • • • • •	シ┊ᢓᢧ᠊ᢓᠯᠵᡃᡐᢩ᠅᠅ᠵ	🕄 🎒 Java	DD 📀	MS 🕸 Debug 🌏 PyDev
Package Explorer 🛛 🗖 🗖	J	SMS.java		X) 🗄 Ou	utli 🛛 🔲 Prop 🛛 🗖
		packa	ge se.du.simpletracker;		*	59	
info24			AVD/SDK manager	r /			se du simpletracker
info24t1		• import	android.app.Activity;			1 7	import declarations
🕞 IntentDemo				vvindow > Oper	ן ר	6	SMS
🖉 LifeCycleTest		publi	c class SMS extends Activity	Deneneetive	=		btnSendSMS : Button
🖉 MainActivity		{	niveto Button htsCandCMC.	Perspective			txtPhoneNo : EditText
🗐 MyThreadActivity		pi pi	<pre>'ivate Button Dinsendsms; civate EditText txtPhoneNo. txtMessage:</pre>	•			txtMessage : EditText
🚰 nheid-unitedcoders-android		pi pi	rivate String mIntentString;				mIntentString : String
🚰 SimpleTracker							🛛 🔺 onCreate(Bundle) : voi
😂 SMS		/*	** Called when the activity is first created. */				😪 🛛 new OnClickListe
/ src		ອ @0	Jverride ublic void onCreate(Bundle savedInstanceState) {				sendSMS(String, String)
🖶 se.du.sms		P.	<pre>super.onCreate(savedInstanceState);</pre>				
BinarySmsReceiver.java			<pre>setContentView(R.layout.sms);</pre>				
I MmsReceiver.java			https://www.contensional.com/				
J SMS.java			<pre>btnSendSMS = (Button) TindviewById(K.id.btnSendSMS); tytPhoneNo = (EditTeyt) findViewById(R id tytPhoneNo);</pre>				
SmsReceiver.java			txtMessage = (EditText) findViewById(R.id.txtMessage);				
🕮 gen [Generated Java Files]							
e.du.sms		Θ	<pre>btnSendSMS.setOnClickListener(new View.OnClickListener()</pre>				
J R.java		0	i nublic void onClick(View v)				
Android 2.2		Ŭ	{		-		
android.jar - C:\android-sdk-windov			Υ.		•		4 III
		-					
🗁 res		Problems	🦉 @ Javadoc 🔄 Declaration 🛛 🖉 🖳 Console 🔗 Search				2 <u> </u>
							*
con.prig		•					
🗁 drawable-mdni		•	R.java - This file is automatically generated by <i>i</i>	Android Developer Tools	and		
			'connects" the visual resources to the Java sor	urce code, we never touc	h it oı	ursel	ves
x main.xml							
in a state of the state of							
x strings.xml		•	res - Externalization of strings and graphics ma	any other resource types			
AndroidManifest.xml				5			
default.properties		<u> </u>					
proguard.cfg		•	ayout - Contains the visual elements or resour	rces in xml, for use by An	droid	activ	lties
😂 StatusBarTest				-			
😂 Sudoku						lieeti	
😂 uitest			Androidivianitest.xml - This file contains all gen	ieral information about the	e app	licati	on
· · · · · · · · · · · · · · · · · · ·							T
4	4					_	4

Eclipse with Android SDK - DDMS 攁 🛒 👚

DDMS - SimpleTracker/src/se/du/sin	npletracker/SMS.java - Ec	lipse					
<u>F</u> ile <u>E</u> dit <u>S</u> ource <u>N</u> avigate Se <u>a</u> rcl	h <u>P</u> roject Refac <u>t</u> or <u>F</u>	<u>R</u> un <u>W</u> indow	<u>H</u> elp				
	5 🗃 😫 J J 🗃	参 - ○ - (2 - 🙆 😕 🖨 🗸 -	👎 🌙 😜 🔳 [<u>n 4 % 5 - 7 - 7 4</u>	🗅 🔻 🎝 👻 🔛 🔛 🔿	🌣 Debug 👌 PyDev
Devices 🛛	- 8	🖏 Threads 🗌	🕽 Heap 🗍 Allocation Track	er 🚎 File Explorer 🛛	😁 Emulator Control 🛛		- 8
¥ 8 8 M	- % 🐲 📾 📸 🔻	Telephony	Status				
Name		Voicer	no - Speed Eul	- 1			
	125	Voice: mor	speed: Full		Λ		
seftpally spow 18930	2.5.5	Data: hor	me 🔻 Latency: None	• •	\backslash		
E emulator-5554 Online	ani14 [4 0 1 d	T			\mathbf{h}		
system process 79	8601	Telephony	Actions		1		
com.android.sv 142	8602	Incoming r	number: 5556	Emu	ilator control. File Ex	plorer etc.	
com.android.in 156	8603	O Voice					
com.android.pl 171	8604	SMS					
com.android.la 185	8605	Message:	SMS cäntl	 Rem 	nember to select the	desired emulator/phone in Devic	es 👘
com.android.se 211	8606		SIVIS Salit:			·	
android.proces 239	8607						
com.android.cz 258	8608			Proc	ess control is possit	ble if a process is selected	-
com.android.dc 292	8609				-	-	
com.android.cc 309	8610	Send Har	ig Up				
android.proces 331	8611			Log(Sat Method	Purpose	
com.android.m 340	8612	Location Con	trols				
com.android.pr 359	8613	Manual G	PX KML		Log.e()	Log errors	
com.android.er 389	8614	Decimal					
com.android.ex 407	8615	Sexagesi	भाव		Log.w()	Log warnings	
		Longitude	-122 084095				
			122,001033		Log.i()	Loginformational	
		Latitude	37,422006		3 ()	appendia	
		Send				messages	
							*
🗊 LogCat 🛛 📮 Console					Log.d()	Log Debug messages	- 8
Saved Filters 🔶 🗕 📝	Search for messages. A	Accepts Java reg	exes. Prefix with pid:, app:, tag:	or text: to limit scop	_{e.} Log.v()	Log Verbose mesages	se 🔻 🔒 🖳 🔟
All messages (no filters)	L Time	PID	Application	Tag	Text		A
	T 10-20 07:53:1	185	com android launcher	dalvikum-hean	Grow bean (frag case) to 7 9	31MB for 153680-bute allocation	
	D 10-20 07:53:1	185	com android launcher	dalvikum	GC FOR ALLOC freed 2K 78 fr	we 8048K/8583K nauged 62mg	
	D 10-20 07:53:1	79	evetem process	dalvikum	GC CONCIDEENT freed (95% 93	free 0100V/0027V nameed 7me±15me	
	W 10-20 07:53:1	221	android process	MadiaScappor	SC_CONCORRENT LIFEG 490K, 68	t/adaard/ android secure/lakinping: Downic	
	W 10-20 07:53:1	221	android process.media	MediaScapper	prupeDeadThurbpailFiles	ndroid databage aglite SOLiteCursor@41052040	
	V 10-20 07:53:1	221	android process.media	MediaScanner	(nmunoDoodThumhnailFiles a	android databage aglite SQLICeCursor@410579d0	
	v 10-20 07:53:1	331	android.process.media	nediascanner	/prunebeadinumbnaliriles	android.database.sqiite.sybitecursor@410b/9d0	•

Eclipse with Android SDK - Debug 攁 🛒 👘

Debug - SMS/src/se/du/sms/SMS.java - Eclipse				
<u></u>)			
	🍅 🏇 • 🗘 • 💁 • 🔊	≝ ⊜ ℛ ▾ ┆ ᄬ ⊿ ⋧ ▣ ┓ ┆ ୰ %	P [#] P	🖹 🐉 Java 🚳 DDMS 🌾 Debug ಿ PyDev
🕸 Debug 🛿 🦉 🚺 📓 🕅 🖏 🖓 .	<u> </u>	Variables 🖾 🗣 Breakpoints		≝ ≉ ⊑ ▽ □ □
Image: Signature Image: Signature Image: Signature Signature Image: Signature		eme this message phoneNo binary	Value SMS ("" (id= "23423 false	id=830019590464) .830019702040) " (id=830019701952)
	· · ·			1
<pre>SMS.java % } private void sendSMS(boolean binary) { String phoneNo = txtPhoneNo.getText().toString(); String message = txtMessage.getText().toString(); if(phoneNo.length() > 0 && message.length() > 0) { if(binary) sendBinarySMS(phoneNo, message.getBytes()); else sendTextSMS(phoneNo, message); } else </pre>	Remember to star Debug controls Breakpoint	t with the debug button!		Outline X Image: Sector of the sec
🗳 Console 🛛 🖉 Tasks				🖹 🔂 🛃 🗖 🗕 🕶 🗖 🗖 🗖
Android [2011-10-20 10:08:31 - SMS] Android Launch! [2011-10-20 10:08:31 - SMS] adb is running normally. [2011-10-20 10:08:31 - SMS] Performing se.du.sms.SMS activity launch [2011-10-20 10:08:31 - SMS] Automatic Target Mode: Several compatible t [2011-10-20 10:08:37 - SMS] Application already deployed. No need to re [2011-10-20 10:08:37 - SMS] Starting activity se.du.sms.SMS on device e [2011-10-20 10:08:39 - SMS] ActivityManager: Starting: Intent { act=and [2011-10-20 10:08:40 - SMS] Attempting to connect debugger to 'se.du.sm	argets. Please select a targe install. emulator-5554 droid.intent.action.MAIN cat=[ns' on port 8616	t device. android.intent.category.LAUNCHER] cmp=	se.du.sms/.SM	s }
				Loughing CMC
				Launching SMS

Run or debug on-device



- You need to enable your device to install Android applications other than those from the Android Market
 - Menu > Settings > Applications > check (enable) the option called Unknown Sources
- Menu > Settings > Applications > Development
 - USB Debugging: This setting enables you to debug your applications via the USB connection.
 - Stay Awake: This convenient setting keeps the phone from sleeping in the middle of your development work, as long as the device is plugged in.
 - Allow Mock Locations: This setting enables you to send mock location information to the phone for development purposes and is very convenient for applications using location-based services (LBS).



SDK and AVD manager



Android SDK Manager				r	×						
Packages Tools				📑 Android Virtual	Device Manager	and the local division of the local division					×
SDK Path: C:\android-sdk-windows\				11. A . 1. A							
Packages				List of existing And	droid Virtual Device	es located at C:	\Users\hjo\.andr	oid\avd			
× Name	ADI	Paul	Chatur	AVD Name	Target Nam	e	Platform	APIL	.evel	CPU/ABI	New
	API	Nev.	Status	✓ myayd1	Google APIs	(Google Inc.)	233	10		ARM (armeabi)	
Andraid SDK Taala		14	The stall and	- Inyavai	GOUGIE APIS	(Coogle Inc.)	2.5.5	10			Edit
Android SDK Tools		14		✓ myavd2	Google APIs	(Google Inc.)	2.3.3	10		ARIVI (armeabi)	
Android SDK Platform-tools		0	- Installed	🗸 api14	Android 4.0		4.0	14		ARM (armeabi-v7a)	Delete
Android 4.0 (API 14)	14	1				r				~	
SDK Platform	14	1				🕒 Edit And	roid Virtual Devi	e (AVD)			Repair
□ □ □ Sok Platform	14	1									
ARM FABLy7a System Image	14	1				Name	anil4				Details
Google APIs by Google Inc	14	1				INdiffe.	apiz4				
Android 3.2 (API 13)	11	-	Instance			Target	Android 4.0 - A				Start
Android 3.1 (API12)						raiget.	Android 4.0 - A	FILEVEI 14		·	
Android 3.0 (API 11)						CDUIAD	APM (armashi				
A C Android 2.3.3 (API10)						CPU/ADI:	ARIVI (armeabi-	v/d)			
SDK Platform	10	2	A Installed			SD Card:					
Samples for SDK	10	1	A Installed			ob cara					
Dual Screen APIs by KYOCERA Corporation	10		Not installed				Size: 20			MiB 👻	
EDK 1.1 by Sony Ericsson Mobile Communications	10		Not installed								
Google APIs by Google Inc.	10	2	A Installed				File:			Browse	
Android 2.2 (API 8)											
SDK Platform	8	3	🚔 Installed			Snapshot:					
Samples for SDK	8		Not installed				Cashlad				
V Loual Screen APIs by KYOCERA Corporation	8		Not installed				Enabled				
🔽 🙀 Real3D by LGE	8		Not installed								
GALAXY Tab by Samsung Electronics.	8		Not installed			Skin:					
🔲 🙀 Google APIs by Google Inc.	8	2	A Installed				O Built-in:	HVGA		_	Refresh
Image: Provide and Provide Ample				A			0				
				A valid Androi	d virtual Device. 🖄		Resolution:		x		
[] Android 1.5 (API 3)				🛛 🗙 An Android Vi	rtual Device that fa	i I					
🔺 🥅 🧰 Extras						Hardware:					
📃 🛃 Android Compatibility package		4	🎒 Installed								
📃 🛃 Google Admob Ads Sdk package		3	🎒 Installed				Property		Value	New	
🔲 🛃 Google Market Billing package		1	Installed				Abstracted L	D density	160		
🔲 🛃 Google USB Driver package		4	🎒 Installed				Mostructed Et	in density	24	Delete	
🔲 🛃 Google Webdriver package		1	🎒 Installed				IVIAX VIVI appl	cation nea	24		
🔲 🛃 Google Market Licensing package		1	🎒 Installed				Device ram si	ze	256		
🔲 🛃 Market Licensing package		1	🞒 Installed								
						Override	e the existing AVI) with the car	ne name		
						Overnue	e the existing Avi	2 which the Sar	ne name		
Show: Vpdates/New VInstalled Obsolete Select N	ew/Updat	es		Install 6 package	es						
Sort by: API level C Kepository Deselect	All			Delete package	es						
								Ec	lit AVD	Cancel	
Done loading packages.											

Steps to create your first app 攁 🐔 🖆

- Assuming you have a working development installation
- In Eclipse select File > New Project > Android Project
- Give a project name and select a build target (an AVD must exist)
- Enter application info details give a package name

New Project	New Android Project	New Android Project		New Android Proj	ject	
 New Project Select a wizard Wizards: type filter text General Android Project Android Sample Project Android Test Project CVS Java Maven 	 New Android Project Create Android Project Select project name and type of project Project Name: HelloAndroid Create new project in workspace Create project from existing source Create project from existing sample Use default location Location: D:/hjo/workspace/HelloAndroid Working sets Add project to working sets 	 New Android Project Select Build Target Choose an SDK to target Build Target Target Name Android 2.2 Google APIs Android 2.3.3 Google APIs Q Android 4.0 Google APIs 	Vendor Android Open Source Project Google Inc. Android Open Source Project Google Inc. Android Open Source Project Google Inc.	 New Android Proj Application Info Configure the new Application Name: Package Name: Create Activity: Minimum SDK: Create a Test Proj Test Project Name: Test Application: 	Android Project HelloAndroid se.du.helloandroid HelloAndroidActivity 14 ject HelloAndroidTest HelloAndroidTest	
➢ PyDev ➢ Examples	W <u>o</u> rking sets:		< <u>B</u> ack	Test Package:	se.du.helloandroid.test < Back	Cancel



Hello World



```
// HelloWorldMIDlet.java
import javax.microedition.midlet.*;
import javax.microedition.lcdui.*;
```

```
public class HelloWorldMIDlet extends
MIDlet
```

```
private Display display;
private Alert warning;
```

```
public HelloWorldMIDlet()
{
    warning = new Alert("Hi!", "Hello
    World!", null, null);
    display =
        Display.getDisplay(this);
}
```

```
package se.du.helloandroid;
import android.app.Activity;
import android.os.Bundle;
import android.widget.TextView;
```

```
public class HelloAndroidActivity extends Activity {
  private TextView mTV1;
/** Called when the activity is first created. */
     Qoverride
  public void onCreate(Bundle savedInstanceState)
     super.onCreate(savedInstanceState);
   // alt.1 via layout in XML
     setContentView(R.layout.main);
     mTV1 = (TextView) findViewById(R.id.textView1);
     mTV1.setText(R.string.hello android);
     // alt.2 via Java code
     TextView tv = new TextView(this);
     tv.setText("Hello, Android");
     setContentView(tv);
// the other lifecycle methods
// use @Override for all
     public void onStart() {super.onStart();}
     public void onRestart() {super.onRestart();}
     public void onResume() { super.onResume(); }
     public void onPause() { super.onPause(); }
     public void onStop() {super.onStop();}
     public void onDestroy() {super.onDestroy();}
```

Project > Build and Run



AndroidManifest.xml



I HelloAndroidActivity.java	🔄 HelloAndroid Manifest 🛛	a *main.xml	J HelloAndroidA	ctivity.java	d HelloAndroid Manifest	🛛 🖸 *main.xml			
<pre>HelloAndroidActivity.java <th><pre>HelloAndroid Manifest & ncoding="utf-8"? id="http://schemas.android. Lloandroid" de="1" me="1.0" > :minSdkVersion="14" /> "@drawable/ic_launcher" ="@string/app_name" > abel= @string/app_name" ame=".HelloAndroidActivity" ilter > on android:name="android.in gory android:name="android.</pre></th><th><pre>*main.xml .com/apk/res/android" ' > tent.action.MAIN" /> .intent.category.LAUNCHER" /></pre></th><th>HelloAndroidA Manifest Gene Defines general in Package Version code Version name Shared user id Shared user label Install location Manifest Extras UUses Sdk</th><th>ctivity.java Aanifest ral Attributes formation abo se.du.helloar 1 1.0 0 0 0</th><th>(HelloAndroid Manifest ut the AndroidManifest.xml ndroid (S) (P) (U) (C) (U) (P) (O)</th><th>Az Attributes for U</th><th>ses Sdk k tag describes the SDK features t</th><th>Browse Browse Browse bat the perate</th><th></th></pre>	<pre>HelloAndroid Manifest & ncoding="utf-8"? id="http://schemas.android. Lloandroid" de="1" me="1.0" > :minSdkVersion="14" /> "@drawable/ic_launcher" ="@string/app_name" > abel= @string/app_name" ame=".HelloAndroidActivity" ilter > on android:name="android.in gory android:name="android.</pre>	<pre>*main.xml .com/apk/res/android" ' > tent.action.MAIN" /> .intent.category.LAUNCHER" /></pre>	HelloAndroidA Manifest Gene Defines general in Package Version code Version name Shared user id Shared user label Install location Manifest Extras UUses Sdk	ctivity.java Aanifest ral Attributes formation abo se.du.helloar 1 1.0 0 0 0	(HelloAndroid Manifest ut the AndroidManifest.xml ndroid (S) (P) (U) (C) (U) (P) (O)	Az Attributes for U	ses Sdk k tag describes the SDK features t	Browse Browse Browse bat the perate	
	 Exporting To export the app Use the Export Export an unsi Links The content of th Application: (P) Permission: F Instrumentati XML Source: 	lication for disi <u>Wizard</u> to exp g <u>ned APK</u> and e Android Man Activities, inter Permissions def <u>ion</u> : Instrumen Directly edit th	tribution, you have the follow ort and sign an APK sign it manually iffest is made up of three secont filters, providers, services a fined and permissions used. tation defined. te AndroidManifest.xml file.	ving options: tions. You can also edit the nd receivers.	e XML directly.	erate Browse	E		
Manifest A Application P	Permissions I Instrumentation	AndroidManifest.xml	Manifest	on: Document	ation from the Android SDK	for AndroidManifest.xml.	ect yml		
E maniese E Application				ppication [2564111		

[res	s] lay	out/ma	in.xm	l –		-
lelloAndroidActivity.java 🛛 🔂 He	lloAndroid Manifest	☐ *main.xml ⊠	- 8	🗄 Outline 🔲 Properties	×	- 8
ing config: default		Any locale -	roid 4.0 🔻 Create		r 🗄 🐉	R ~
				Property	Value	
in HVGA (ADP2) ▼ Portrait ▼ []	Normal 🔻 Day tim 👻	Theme	•	Sound effects enab		
)alette 🗸 🗸				Style		
orette			44444	Tag		
Form Widgets			*	Text	@string/hello	
View Large Medium Small Button			- F	Text all caps		
				Text appearance		
	HelloAndroid			Text color		
CheckBox	Hello World, H	elloAndroidActivity!		Text color highligh		
				Text color hint		
RadioButton Checked LextView				Text color link		
				Text cursor drawab		
nner 🗸 🖌				Text direction		
				Text edit no paste v		
				Text edit paste win		
0				Text edit side no pa		
				Text edit side paste		
				Text edit suggestio		
				Text is selectable		
				l ext scale X		
				Text select handle		
				Text select handle I		
				Text select handle i		
				Text size		
				Transform nivet V		
				Transform pivot V		
				Translation X		
ext Fields				Translation V		
ayouts				Typeface		E
omposite				Vertical scrollbar po		
mages & Media				Width		
ime & Date				Visibility		
				⊿ Misc		
Iransitions		@+id/tavt\/ia	λ λ/1	Layout gravity		
Advanced	iu –	W IU/LEXIVIE		Layout height	wrap_content	
Other			_	Layout margin		
Custom & Library Views	4			Layout margin bot		
, ,,,,, ,,,			,	Lavout margin and		-

[res] layout/main.xml and values/strings.xml 🐔 🐔 👘

<pre><?xml version="1.0" encoding="utf-8"?> <linearlayout android:layout_height="fill_parent" android:orientation="vertical" fill_parent"="" xmlns:android="http://schemas android:layout_width="></linearlayout></pre>	s.android.com/apk/res/android"
<textview android:id="@+id/textView1" android:layout_width="fill_parent" android:layout_height="wrap_content android:text="@string/hello_android </textview 	t" 1" />
🕑 HelloAndroidActivity.java 🛛 💿 strings.xml 🛛	
🚔 Android Resources (default)	
Resources Elements (S) (D) (S) (I) (Az (S) hello (String) (S) app_name (String) (Add) (S) hello_android (String) (Up	Attributes for hello_android (String) (S) <u>Strings</u> , with optional simple formatting, can be stored and retrieved as resources. You can add formatting to your string by using three standard HTML tags: b, i, and u. If you use an apostrophe or a quote in your string, you must either escape it or enclose the whole string in the other kind of enclosing quotes.
Down	Name* hello_android Value* Hello, Android
<pre><?xml version="1.0" encoding="utf-8"?: <resources></pre>	<pre>HelloAndroidActivity!</pre>

<string name="app_name">HelloAndroid</string>

<string name="hello_android">Hello, Android</string>

</resources>

Difference C# vs. Java?

- Marginal differences ٠
 - CLR vs. JVM
 - ASP NET vs Servlets
 - WinForms vs. Applets

```
using library;
class Hello {
  public static void Main() {
     Console.WriteLine("Hello world"); }
```

http://www.25hoursaday.com/CsharpVsJava.html

import library; class Hello { public static void main(String args[]) { System.out.println("HelloWorld"); }

- Inheritance ٠
 - Multiple inheritance is not supported by either language
- Operators and control flow •
 - Operator overloading and goto (removed in java) otherwise similar
 - Exception handling
 - Not as forced in C# as in Java
 - A Java programmer just do this: public synchronized void methodName() {...} • Multithreading
 - More simplified in C#, must synchronize with monitor and mutex class
- Read more... •
 - http://en.wikipedia.org/wiki/Comparison of C Sharp and Java

Android application package (apk) build process



a 🖶 se.du.intentdemo

b J BitmapCalloutMap.java

IntentDemo.java

BitmapCalloutOverlay.java

a 🔗 IntentDemo

⊿ 🕮 src

- Can be done by hand from the command line
- Android Asset Packaging Tool (aapt)



ProGuard



🕌 ProGuard		
ProGuard		
Input/Output	noitissimiteo - Optimization	
Shrinking		
Obfuscation		
Optimization	Obtriscention Lieveningeriou	
Information	Android SDK tools revision 12-14 has problem with ProGu	Jard
Process	http://code.google.com/p/android/issues/detail?id=18359	
ReTrace	Welcome to ProGuard, version 4.4	
The ProGuard renaming clas sized .apk file	ProGuard is a free class file shrinker, optimizer, obfuscator, and preverifier. With this GUI, you can create, load, modify, and save ProGuard configurations. You can then process your code right away, or you can run ProGuard from the command line using your saved configuration. With the ReTrace part of this GUI you can de-obfuscate your stack traces. ProGuard and ReTrace are written and maintained by Eric Lafortune. Distributed under the GNU General Public License. Copyright (c) 2002-2009. I tool shrinks, Optimizes, and obfuscates your code by removing unused ses, fields, and methods with semantically obscure names. The result is that is more difficult to reverse engineer.	code and a smaller
Enable ProGuard with the proguard.config property in the <project_root>/default.properties file.</project_root>		

http://developer.android.com/guide/developing/tools/proguard.html

Load configuration...

Next



Emulator Control



Кеу	Emulated Function
Escape	Back button
Home	Home button
F2, PageUp	Menu button
Shift-F2, PageDown	Start button
F3	Call/Dial button
F4	Hangup/EndCall button
F5	Search button
F7	Power button
Ctrl-F3, Ctrl-KEYPAD_5	Camera button
Ctrl-F5, KEYPAD_PLUS	Volume up button
Ctrl-F6, KEYPAD_MINUS	Volume down button
KEYPAD_5	DPAD center
KEYPAD_4, KEYPAD_6	DPAD left, DPAD right
KEYPAD_8, KEYPAD_2	DPAD up, DPAD down
F8	Toggle cell network on/off
F9	Toggle code profiling (when -trace set)
Alt-ENTER	Toggle fullscreen mode
Ctrl-T	Toggle trackball mode
Ctrl-F11, KEYPAD_7	Rotate screen orientation to previous or next layout
Ctrl-F12, KEYPAD_9	

Eclipse and Android SDK

- The emulator only needs to be started once!
- Eclipse IDE for Java Developers 32/64 bit and Java JDK 32/64 bit must match
- Java not found?
 - eclipse.exe -vm "C:\Program Files\Java\jre6\bin\javaw".
- Sometimes import android.R; is wrongly imported into your source especially when copy and pasting code.
- To force IntelliSense press Ctrl + Space at certain places for a pop-up list with syntax and method proposals.
- Try out some of the SDK samples in C:\android-sdkwindows\samples\API-LEVEL if you want.
 - You need to create a new project from existing sample in the New Android Project dialogue in this case.
- Android SDK environment variables
 - Path=c:\android-sdk-windows\tools;c:\android-sdkwindows\platform-tools;c:\Program Files\Java\jdk1.6.0_26\bin
 - "ANDROID_SDK_HOME"="H:"



Find Broken Externalized Strings

Web resources



- Java, Eclipse, Android, and Web Programming Tutorials – http://www.vogella.de/
- Android Developer Pages
 - http://developer.android.com/
- Stack Overflow Discussion Threads
 - http://stackoverflow.com/
- http://www.swedroid.se/
- http://www.anddev.org/
- http://en.wikipedia.org/wiki/Android_ %28operating_system%29
- Bygg din egen Android-app
 - http://www.idg.se/2.1085/1.327186/bygg-din-egenandroid-app