

Android

Lectures on University College
for Applied Computer Engineering
<http://www.racunarstvo.hr/en/>

Miljenko Cvjetko
<http://holisticware.net>

Fast Facts

Interview Questions

- Android definitions, architecture

Fast Facts

Interview Questions

Definitions / Architecture

Fast Facts

Interview Questions

Definitions / Architecture

- Supported programming languages
 1. java
Applications coded in java and compiled (built, packaged) by Android SDK
 2. c#
3rd party tools - Xamarin
Applications coded in java and compiled (built, packaged) by Android SDK
 3. c/c++ for native development
compiled with NDK

Fast Facts

Interview Questions

Definitions / Architecture

- Device setup for development
 - Turn On USB debugging on the Device in the Settings
 - System setup - drivers to properly detect and communicate with the device
 - Application should be declared Debuggable in AndroidManifest.xml

Fast Facts

Interview Questions

Definitions / Architecture

- AndroidManifest.xml
 - important for every application
 - contains vital info about application needed for execution (security permissions, list of components used etc)
 - in the root folder
 - packaged into apk file
- Permission setting
 - define which permissions application needs to run (internet connection, SD card access, telephony features access)
 - designed to protect data and code - making compromising more difficult

Fast Facts

Interview Questions

Definitions / Architecture

- Resources
 - used in application and referenced from code
 - layout definitions in XML
 - Data in Maps (key value pairs) - strings and other constants
 - user defined files XML, JSON, multimedia (images PNG, JPEG)

Fast Facts

Interview Questions

Definitions / Architecture

- Deployment
 1. Android Package APK
 2. Description
 1. compressed folder structure
 - AndroidManifest.xml file
 - application code [.dex files]
 - resource files
 - other files (assets, etc)

Fast Facts

Interview Questions

Definitions / Architecture

- Android Resources
 1. Multiple resources precedence
 - of all resources that match device configuration 'locale' qualifier has highest precedence
 2. multiple resource precedence qualifiers
 - Mobile Country Code MCC and Mobile Network Code MNC
 - Locale

Fast Facts



Interview Questions

Definitions / Architecture

Fast Facts

Interview Questions

Definitions / Architecture

- Android framework
 - important part of Android ecosystem and architecture
 - classes, data and methods - used by developers when writing applications for Android environment
- Emulator
 - enables developers to play around an interface that acts as if it were an actual mobile device
 - developers can write and test codes, and even debug. Emulators are a safe place for testing codes especially if proof of concepts

Fast Facts

Interview Questions

Definitions / Architecture

- Android framework/SDK tools (commandline)
 - adb
Android debug Bridge - remote shell execution for device control and monitoring
 - AAPT - Android asset packaging tool
commandline tool able to deal with zip-compatible archives, which includes creating, extracting as well as viewing its contents.

Fast Facts

Interview Questions

Definitions / Architecture

- Android resources
 - defined in project's res/ folder in specially named subfolders and packed into apk package
 - default resources
 - contain default strings and files
 - if not present application will not run.
- Android project
 - compiled and packaged into apk file (zip compressed)
 - special folder structure
 - AndroidManifest.xml - root folder
 - application code
 - resource files
 - other files

Fast Facts

Interview Questions

Definitions / Architecture

Tools

Fast Facts

Interview Questions

Definitions / Architecture

- AIDL - Android Interface Definition Language
 - handles the interface requirements between a client and a service so both can communicate at the same level through interprocess communication or IPC.
 - process involves breaking down (serializing) objects into primitives that Android can understand.
Required simply because a process cannot access the memory of the other processes.
 - types supported
 - all native Java data types like int, long, char and Boolean
 - strings, charSequences
 - List
 - Map

Fast Facts

Interview Questions

Definitions / Architecture

Fast Facts

Interview Questions

Building Blocks 01

- Fundamental Building Blocks - Components
 1. Activities
 2. Services
 3. Broadcast receivers
 4. Content Providers

Fast Facts

Interview Questions

Building Blocks 02

Fast Facts

Interview Questions

Building Blocks 03

Fast Facts

Interview Questions

Building Blocks 03

- Process types:
 - foreground Process
 - visible Process
 - Service Process
 - Background Process
 - empty process

Fast Facts

Interview Questions

Building Blocks 03

- Service
 1. basic component that does not provide UI
 2. runs in background for indefinite time
 3. can act independently - without user interactions, regardless of whether there are certain or no activities being executed.

Enumerate the steps in creating a bounded services through AIDL. 1. create the .aidl file, which defines the programming interface 2. implement the interface, which involves extending the inner abstracts Stub class as well as implanting its methods. 3. expose the interface, which involves implementing the service to the clients.

Fast Facts

Interview Questions

Building Blocks 03

- Broadcast Receivers
 1. messaging component
 2. can receive and respond/act to broadcast messages/announcements

Fast Facts

Interview Questions

Building Blocks 03

- Content Providers
 1. component for sharing data (only way for sharing data between applications)
 2. store and share data
 3. default for contacts, messages, multimedia (audio, video, images)

Fast Facts

Interview Questions

Building Blocks 04

- Defining Building Blocks in AndroidManifest.xml
 1. Activities:
`<activity></activity>`
 2. Services:
`<service></service>`
 3. Broadcast Receivers:
`<receiver></receiver>`
 4. Content Providers:
`<provider></provider>`

Fast Facts

Interview Questions

Building Blocks 05

- Intents
 1. messages passed between components (Activities, Services, Broadcast Receivers and Content Providers)
 2. set of information, serialized passive data with function/operation info (what is to be done)
- types of Intents
 1. Explicit
Activity needed to respond is explicitly defined
 2. Implicit
platform (Android) decides which Activity is best suited to respond to message

Fast Facts

Interview Questions

Building Blocks 06

- Pending Intents
 1. Intents created by applications and passed to other application where executed as in original application
 2. Creation:

```
getActivity(Context, int, Intent, int),  
getBroadcast(Context, int, Intent, int),  
getService(Context, int, Intent, int);
```

3. Intent Filters:

used to register Activities, Services and Broadcast Receivers being capable of performing certain functionality/action.

What is the function of an intent filters? Because every component needs to indicate which intents they can respond to,

Fast Facts

Interview Questions

Building Blocks 07

- Storing Data
 1. Shared preferences
 2. Internal Storage
 3. External Storage
 4. Database - SQLite
 5. Network Service (on some server - SOAP, REST, XML-RPC etc)

Fast Facts

Interview Questions

User Interface 01

- User Interface types
 1. Views
 2. Notifications
- finding, extracting UI elements from resource files (layout files) and preparing to be accessible in code:

```
findViewById(int;)
```

- Handler classes: send and process messages and runnable objects associated with thread's message queue

Fast Facts

Interview Questions

User Interface 01

- Notification types
 1. Toasts
 2. Statusbar Notifications
 3. Dialog notifications

Fast Facts

Interview Questions

User Interface 01

Fast Facts

Interview Questions

User Interface 01

- Android xml layouts (xml, axml)
 - serialized object graphs in xml
 - Folder res/layout/
 - WYSIWYG definition of UI with tools
 - to use escape characters in attributes use double backslash prefix '\\n'

Fast Facts

Interview Questions

User Interface 01

- ViewGroups / Containers
hold objects and widget (Views, or other ViewGroups) s
together in particular arrangement,

Fast Facts

Interview Questions

User Interface 01

- Orientation
setOrientation();
For LinearLayouts
Defines if the LinearLayouts is represented as a row or as a column.
Values are set as either HORIZONTALs or VERTICALs.

Fast Facts

Interview Questions

User Interface 01

- Fragments
 - part or portion of an activity
 - lightweight activity
 - reusable and modular - used to form Activity
 - using or adding Fragments without using UI is possible, when background work must be done for Activity.

Activity method:

```
add(Fragment,string)
```

Fast Facts

Interview Questions

API

- Phone Call Recording
Permission.PROCESS_OUTGOING_CALLS + API

Fast Facts

Interview Questions

API

- Version support: latest Android OS
Most of the Android devices will enable user to upgrade operating system. . However, not all upgrades would allow you to get the latest version, depending on hardware.
- Bitmaps (regular) vs and a nine-patch images
Nine_patch image allows resizing that can be used as background or other image size requirements for the target device. The Nine-patch refers to the way you can resize the image: 4 corners that are unscaled, 4 edges that are scaled in 1 axis, and the middle one that can be scaled into both axes.

Fast Facts

Interview Questions

API

- Usage: Translation service in Android
The Google translator translates the data of one language into another language by using XMPP to transmit data. User can type the message in English and select the language which is understood by the citizens of the country in order to reach the message to the citizens.
- Usage: removing icons from main screen
Long press on unwanted icon, which activates management state and displays delete/remove button (trash), drag the unwanted icon to delete button.
- Usage: WiFi hotspot (portable/personal hotspot), tethering
Portable Wi-Fi Hotspot allows you to share your mobile internet connection to other wireless device.