

# CS478: Software Development for Mobile Platforms

## Project #3

Due time: 7:00 pm on 3/26/2017

Total points: 100

Instructor: Ugo Buy

TAs: Jennifer Jesuraj and Venkat Sathyanarayanan

For this project you will design and code three new Android apps meant to work together on an Android phone or tablet running Marshmallow. Here is a short summary of the apps:

1. Application  $A_1$  defines a new dangerous-level permission called “*edu.uic.cs478.project3*” and sends one of two kinds of broadcasts. The other two applications will receive the broadcasts; however, these applications will receive the broadcasts only if the sender (i.e.,  $A_1$ ) has that permission. In addition,  $A_1$  defines an activity containing two read-only text views and two buttons. The buttons, when selected, will broadcast two different intents with actions concerning the professional sports of basketball and baseball, depending on the button pressed. The text views describe the meaning of the buttons to the device user. Both broadcasts are *ordered broadcasts*.
2. Application  $A_2$  just receives the intents sent by  $A_1$ ;  $A_2$  does not contain any activities. Whenever an intent is received,  $A_2$  displays a toast message on the device’s display. The toast message indicates whether the broadcast sender was selecting basketball or baseball. However,  $A_2$ ’s broadcast receiver is designed in such a way that it will only respond to a broadcast if the broadcast sender has permission “*edu.uic.cs478.project3*”.
3. Application  $A_3$  also receives  $A_1$ ’s broadcasts if the sender has permission “*edu.uic.cs478.project3*”. Depending on the intent received,  $A_3$  will launch one of two activities. The first activity displays information about at least 6 teams from the National Basketball Association (NBA). The second activity shows at least 6 teams from the Major League Baseball (MLB) league. However, both activities require the application user to grant permission “*edu.uic.cs478.project3*” before displaying the teams.

In addition, each activity consists of two fragments, whose behavior is described below. Finally, application  $A_3$  maintains an *options menu* and an *action bar*. The action bar shows the name of the application (your choice) and the overflow area. The options menu allows a device user to switch between basketball and baseball. The options menu should be clearly accessible from the overflow area.

Each of the two activities in  $A_3$  contains two fragments. The first fragment displays a list of NBA or MLB teams (whichever applies). The device user may select any team from the list; the currently selected item is highlighted. The second fragment shows the official web page of the selected team.

When the device is in portrait mode, the two fragments are displayed on different screens. First, the device will show only the first fragment. When the user selects an item, the first fragment disappears and the second fragment is shown. Pressing the “back” soft button on the device, will return the device to the original configuration (first fragment only), thereby allowing the user to select a different team. When the device is in landscape mode, application  $A_3$  initially shows only the first fragment across the entire width of the screen. As soon as a user selects an item, the first fragment is “shrunk” to about 1/3 of the screen’s width. This fragment will appear in the left-hand side of the screen, with the second fragment taking up the remaining 2/3 of the display on the right. Again, pressing the “back” button will return the application to its initial configuration. The action bar should be displayed at all times regardless of whether the device is in portrait or landscape mode.

Finally, the state of application  $A_3$  should be retained across device rotations, e.g., when the device is switched from landscape to portrait configuration and vice versa. This means that the selected list item (in the first fragment) and the page displayed in the second fragment will be kept during configuration changes.

As for the order of execution of  $A_2$  and  $A_3$ 's receivers, you should configure all three apps in such a way that the receiver in  $A_2$  is *always* executed before a receiver in  $A_3$ , after  $A_1$  sends a broadcast.

**Implementation notes.** For this project use a Nexus 5 device running the usual Android platform (API 23—Marshmallow). You are not required to provide backward compatibility with previous Android versions. Use method *setRetainInstance()* to prevent fragments from getting deleted when a configuration change occurs, resulting in the destruction of the containing activity. Check out the app *Fragments Static Config Layout* from Adam Porter's Coursera course to see how to work fragment retention in  $A_3$ . Finally, when launching  $A_2$ , use the *Run...* menu to indicate that this app must run without a default activity.

*You must work alone on this project.* Submit the three Studio projects as a zip archive using the submission link in the assignment's page on Blackboard. No late submissions will be accepted.