CS478: Software Development for Mobile Platforms

Project #3

Due time: 9:00 pm on 3/22/2019

Total points: 100

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This project consists of three communicating apps, A_1, A_2 and A_3, described below. The apps are supposed to work together in order to allow a user to shop for smart phones.

1. Application A_1 contains two activities and a broadcast receiver. The main activity contains a welcome message and a button. When the button is pressed, the activity checks whether app A_1 has obtained dangerous permission *edu.uic.cs478.s19.kaboom*. (This permission is defined in app A_3 below.) If A_1 does not have the permission, it requests it of the user. If the user grants the permission, processing continues by creating and registering its broadcast receiver programmatically. Subsequently, A_1 launches the main activity in app A_2 and enters the stopped state.

   The broadcast receiver catches broadcast intents sent by A_3 and launches the second activity in order to display the image of the smart phone.

   The second activity is intended to display the web page of smart phones as requested by A_3. The broadcast intent will contain an extra specifying the smart phone whose page must be displayed. The activity should be destroyed when the user starts a new activitiy on top of it. (It is automatically destroyed, when the user presses the "back" button.)

2. Application A_2 consists of a single activity and a broadcast receiver. The activity is started by A_1; however, this activity requires that the A_1 activity have permission *edu.uic.cs478.s19.kaboom*. If A_1 does not have the permission, A_2's main activity is not started. Otherwise, the main activity of A_2 displays a welcome message and a button. When the button is pressed, the activity checks whether A_2 was granted permission *edu.uic.cs478.s19.kaboom*. If A_2 does not have the permission, it requests it in a way similar to A_1. If the permission is granted, A_2 registers its receiver and then starts the main activity in application A_3. If the permission is denied, A_2 displays a toast message and terminates itself.

3. Application A_3 contains a single activity that consists of two fragments. In addition A_3 defines permission *edu.uic.cs478.s19.kaboom*. This application starts when its main activity receives the intent sent by A_2, if A_2 has permission *edu.uic.cs478.s19.kaboom*. In this case, A_3's main activity is displayed with its first fragment.

   App A_3 maintains an *action bar*. The action bar shows the name of the application and an icon associated with the application (your choice). The action bar has an options menu that displays just two menu options: (1) launch applications A_1 and A_2 and (2) exit A_3. When the first item is selected, A_3 broadcast a single, ordered intent to start A_1 and A_2. Assuming that A_1 and A_2 have the permission, A_2 will first display its toast message, then A_1 will display the web page of the currently selected smart phone. If no smart phone is selected yet, no intent is sent and a toast message is displayed instead.

   The main activity in A_3 contains two fragments. The first fragment displays a list of smart phone names. (Each list item consists of a single string.) The device user may select any point from the list; when this happens, the selected item is highlighted. The second fragment shows an image of the selected item.

   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 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 smart phone. 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_1 and A_2's receivers, you should configure these apps in such a way that a receiver in A_2 is *always* executed before the receiver in A_1, after A_3 sends a broadcast.

Implementation notes. For this project use the usual Pixel 2 device running Android 9 (API 28—Pie). You are not required to provide backward compatibility with previous Android versions. Use of deprecated fragment classes is acceptable without penalty. 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 and app *Fragments Dynamic Layout* to see how to configure fragments dynamically. Don't forget to add fragment transactions to the backstack.

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.