CMPS 312 Mobile Application Development

LAB 4: Intents and permissions

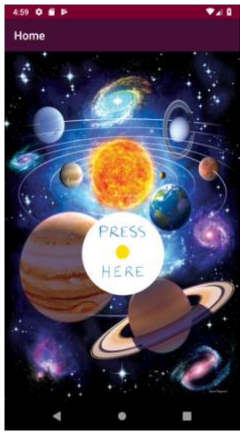
Objective

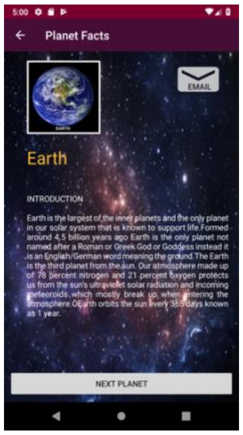
Familiarize yourself with the Android Intents and Permissions. Android Intents are mainly a simple message objects which are used to communicate from one activity to another. Intents define intention of an Application. They are also used to transfer data between activities. In this lab you will learn how to:

1. Implement Explicit and Implicit Intents
2. Handle Tasks and launcher modes
3. Declare permissions and,
4. Handle runtime permissions for API >= 23 and much more.

Overview

In the lab you will be creating the following application which will demonstrate all of the above concepts.

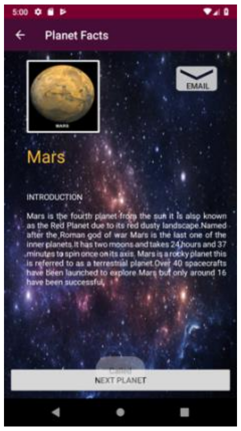




Earth

INTRODUCTION

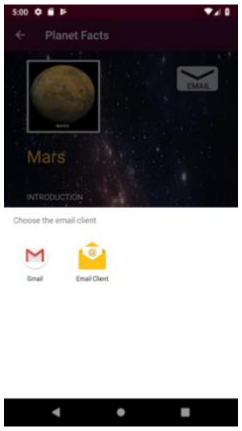
Earth is the largest of the inner planets and the only planet in our solar system that is known to support life.Formed around 4,5 billion years ago Earth is the only planet not named after a Roman or Greek God or Goddess instead it is an English/German word meaning the ground.The Earth is the third planet from the sun. Our atmosphere made up of 78 percent nitrogen and 21 percent oxygen protects us from the sun's ultraviolet solar radiation and incoming meteoroids, which mostly break up when entering the atmosphere.OEarth orbits the sun every 365 days known as 1 year.

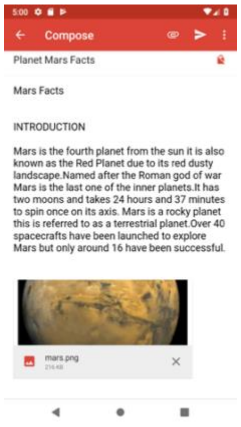


Mars

INTRODUCTION

Mars is the fourth planet from the sun it is also known as the Red Planet due to its red dusty landscape.Named after the Roman god of war Mars is the last one of the inner planets.It has two moons and takes 24 hours and 37 minutes to spin once on its axis. Mars is a rocky planet this is referred to as a terrestrial planet.Over 40 spacecrafts have been launched to explore Mars but only around 16 have been successful.





Planet Mars Facts

Mars Facts

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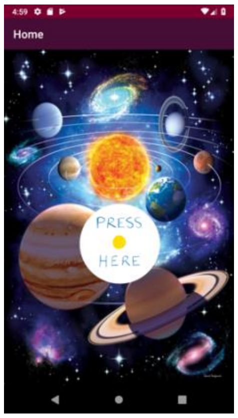
PART A
CREATE THE SOLAR SYSTEM APPLICATION

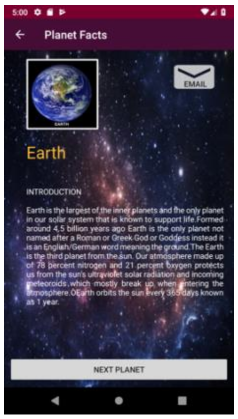
1. Sync **Lab 4** repo from GitHub and put it inside your repo. You will be using this repo to accomplish the application shown above.
2. Open the provided android project named d"**ImplicitExplicitPermissions**"
3. Create the **application launcher Icon**. You can download any "**solar or planet"** png picture with a transparent background from google and use it as your application Icon.
4. Create an **emulator with API 26 or above**. If you already have this, you go to next step.
5. Test your application in the emulator.
6. Go to your **activity_home_screen** and modify the background to **solar_system_bg.png**. You can also use the repeating background tile that we studied in the previous lab. You can download your own Image from the [http://bgrepeat.com] site or use the one provided inside the **drawable called solar_system_bg**
7. Open the "**HomeActivity**" activity add a listener to the **Press Here Button**.
8. When the user presses on the button open the **PlanetFactsActivity** and pass an extra that contains the number 0. This would be the index of the planet that you will be loading.
9. **Run the application.** [It is important the app runs before moving to the next part B]**.**

PART B
EXPLICIT INTENTS

TASK: 1 In this part you need to implement the first navigation of the application.

a. When the you press on the button "**PRESS HERE**" , the app should navigate to a **PlanetFactsActivity** which displays the selected planet with its description.
b. When you press on the **Next Planet** button, relaunch the same activity and pass to an incrememnted index to load one of the new planets in the Array. Once you do that it should change the image as well as the fact of the planet as shown in the screenshots below.
c. Run you application.
d. If you have accomplished the above, then you can move to part C.





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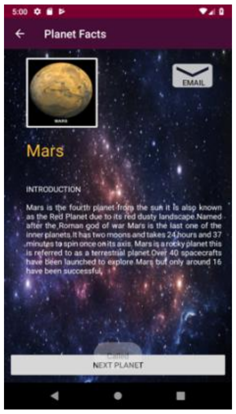

Mars

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PART C
TASKS AND BACK STACK-LAUNCH MODES

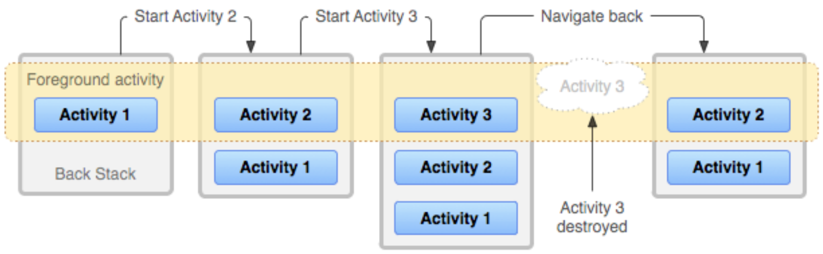


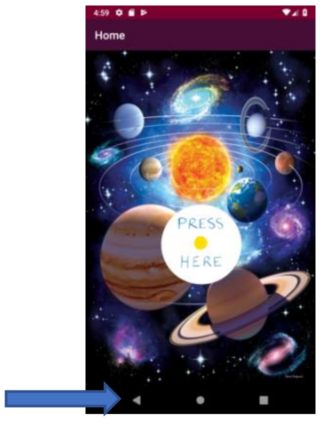
Figure 1 BackStack from https://android.jlelse.eu

ISSUE: Whenever the user presses on the "Next Planet" Button the "PlanetsFactsActivity" activity creates a new copy of itself with a different index. Which means when you press the back button you will not go back to the Previous activity HomeActivity instead you will go through all of the previous planet with their description that you viewed.

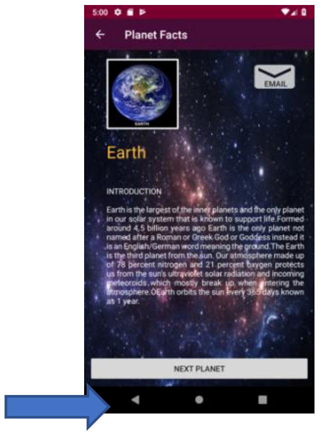
GOAL: When the user presses back button at any time we need to navigate back to the **HomeActivity** screen and not to the same screen with different planet.

[Click here to see the Android Launch Mode Animated]()

HomeActivity



PlanetsFactsActivity



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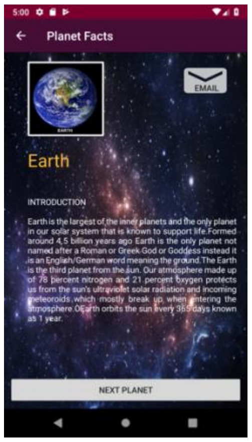
To achieve the above behavior, you need to do couple of things.

1. First you need to modify the **manifest** file **AndroidManifest.xml** and add **launcherMode= singleTop** the **"PlanetsFactsActivity"** as shown below.
2. Next Override the onNewIntent method inside the **"PlanetsFactsActivity"**
3. **Run the application** and see if the back button behavior is correct. It should directly take you back to the previous activity and not same activity with different planet.

PART D
IMPLICIT INTENTS AND RUNTIME PERMISSIONS

TASK 1 In this part we want the user to be able to share the planet through email. When the user presses on the Email button, the application should fire an implicit intent which opens all the email clients configured in the device. If you only have one email client, then it should open that one for you without asking.


Planet Facts

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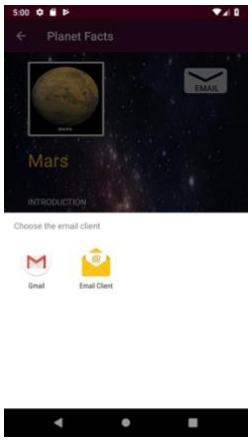

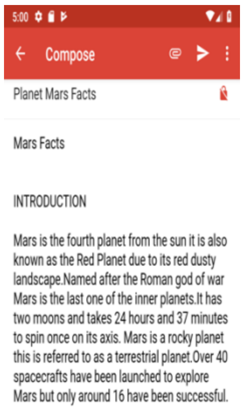
Compose

Planet Mars Facts

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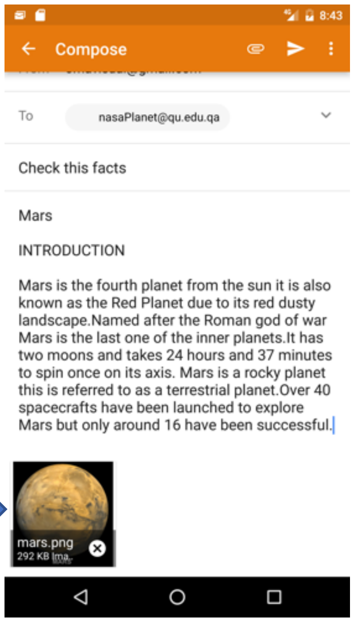
1. To achieve the above task, go to the **PlanetsFactsActivity** and add the following method **"sendEmail"** that handles the Email button click. And also add "sendSMS" method that handles the SMS button click. Inside them, write the code which allows you to send through implicit intent.
2. Run your application.

TASK 2

ISSUE: If you want to attach the PLANET Image as an attachment then you will need to ask the user for the READ/WRITE to external storage permissions. If you do not ask for this permissions, then you will not be able to attach the planet images from the internal storage.

GOAL: When the user presses on the Email button,

A. The app should first check if the it has the READ/WRITE permission.
B. Then, If the application had permission granted before, then app should launch the email with attachment as shown in the image below.
C. If the user did not grant them before then the application needs to request the permission.
D. If the user rejects the requested permission, then the app should display an information to the user that informs them on why the app needs the READ/WRITE permission on a dialog box.
E. If the user grants the permission the app should inform the user that they can use the email attachment.



To nasaPlanet@qu.edu.qa

Check this facts

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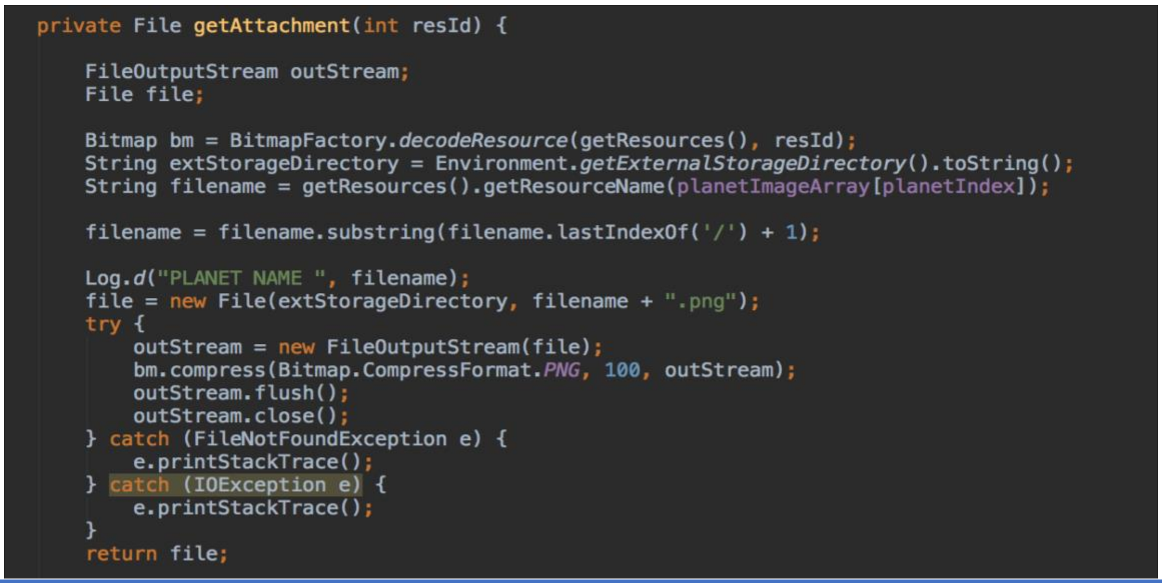
1. To achieve the above task, first you need to add the necessary permissions to your manifest file.
2. Open **PlanetsFactsActivity** and add the following methods
   a. **requestThisPermissions(String permissions[])**
   b. **onRequestPermissionsResult**
   c. **getAttachment(int resId)**

3. The following method will help you with the attachment. So just copy it from the assets folder if you don't want to type it all.



```java
private File getAttachment(int resId) {

    FileOutputStream outStream;
    File file;

    Bitmap bm = BitmapFactory.decodeResource(getResources(), resId);
    String extStorageDirectory = Environment.getExternalStorageDirectory().toString();
    String filename = getResources().getResourceName(planetImageArray[planetIndex]);

    filename = filename.substring(filename.lastIndexOf('/') + 1);

    Log.d("PLANET NAME ", filename);
    file = new File(extStorageDirectory, filename + ".png");
    try {
        outStream = new FileOutputStream(file);
        bm.compress(Bitmap.CompressFormat.PNG, 100, outStream);
        outStream.flush();
        outStream.close();
    } catch (FileNotFoundException e) {
        e.printStackTrace();
    } catch (IOException e) {
        e.printStackTrace();
    }
    return file;
```

4. Finally you need to modify the **SendEmail**() Method that you have implemented before. You need an if else statement that checks if you have the appropriate permissions. If yes, then you can attach a file. If you do not have then request the permission from the user before attaching.
5. Run the application.