University of Canberra
Faculty of Science and Technology

Mobile Technologies (11492)
Additional Assignment
Alternative assessment in lieu of final exam

Available date: **1:00 PM Monday 18/05/2020 (Week 15)**
Submission date: **1:00 PM Friday 22/05/2020 (Week 15)**
Type: Individual assignment
Total mark: 52
Proportion of unit assessment: 52%
Submission: A compressed (.zip) file that contains the following:
- Your entire Android Studio project for Task 5, and
- A file that contains your answers to 5 tasks given in this assignment (MS Word or PDF file)

Submit this compressed (.zip) file via Canvas site of this unit. Email submission is not accepted.
Late submission: No late submission is accepted.
Extension: No extension is granted. Please contact UC to apply for **Deferred Exam/Assignment**.
Learning Outcomes of this Mobile Technologies (11492) unit:
1. Describe the various issues associated with modern mobile technologies, devices, standards and services;
2. Apply problem solving skills in designing and development: mobile application structures, mobile applications with database, and security requirements;
3. Analyse mobile technologies, and interpret the technical requirements for a given mobile application;
4. Develop mobile applications using Android, iOS and Windows Phone; and
5. Evaluate modern mobile technologies and software development tools for mobile devices.

Task 1: [5 marks] Mobile App Development (Learning Outcome 1)
Analyse and evaluate programming languages, mobile devices (phone, tablet and watch), and software development tools for the following mobile app development providers (max 2 pages):
- Google https://developer.android.com/
- IBM https://developer.ibm.com/solutions/mobile-app-development/
- Apple https://developer.apple.com/ios/
- Microsoft https://visualstudio.microsoft.com/vs/features/mobile-app-development/

Task 2: [5 marks] Machine Learning (ML) and Cloud Mobile Technologies (Learning Outcome 5)
Use Computer Vision services from the following mobile app development providers to analyse and evaluate the Machine Learning (ML) and Cloud mobile technologies and describe issues associated with these technologies and mobile devices (phone, tablet and watch) (max 2 pages):
- Google https://developers.google.com/ml-kit/vision
- IBM http://www.redbooks.ibm.com/redbooks/pdfs/sg248393.pdf
- Apple https://developer.apple.com/documentation/coreml
- Microsoft https://azure.microsoft.com/en-us/services/cognitive-services/computer-vision/

Task 3: [5 marks] Location Mobile App (Learning Outcome 3)
Analyse all technical requirements (both hardware and software requirements) for 7 Google Play Location samples in the following project https://github.com/android/location-samples (max 1 page, no need to run these projects, just read available documents).

### Task 4: [5 marks] Mobile App Structures (Learning Outcome 2)
Download **Task4.zip** in Canvas and unzip to get an Android project. List 5 errors of this project and show how to fix them (max 1 page).

Task 5: [32 marks] Design and develop an Android mobile app with the requirements listed below (Learning Outcomes 2, 3, 4 & 5)

Download **Task5.zip** in Canvas. You must use the template in **Task5.zip** to design and develop this app. The user can use this app to turn on camera on mobile phone or tablet to capture photo of objects (fruits or people or a business card or others). The user can also use this app to load an existing image of such objects from the current mobile phone or tablet. The image from camera or loaded will be automatically sent to **Google Firebase Machine Learning (ML) Kit** or **IBM Watson AI & ML Cloud Services** for image processing and classification (the app provides both Google and IBM cloud services for the user to choose before sending the image). The results will be either recognised fruits (apple, banana, etc.) or recognised face characteristics (number of faces, ages, genders, etc.) or recognised text (name, job title, contact details, etc. for business card) or others. These results will be sent back in text format to the app. The app displays these results to the user to edit then save to a **Firebase realtime database** together with the image to **Firebase storage**. The app also lists all images and results as list items for the user to see and edit then save. **Below are screenshots for your app to produce.**
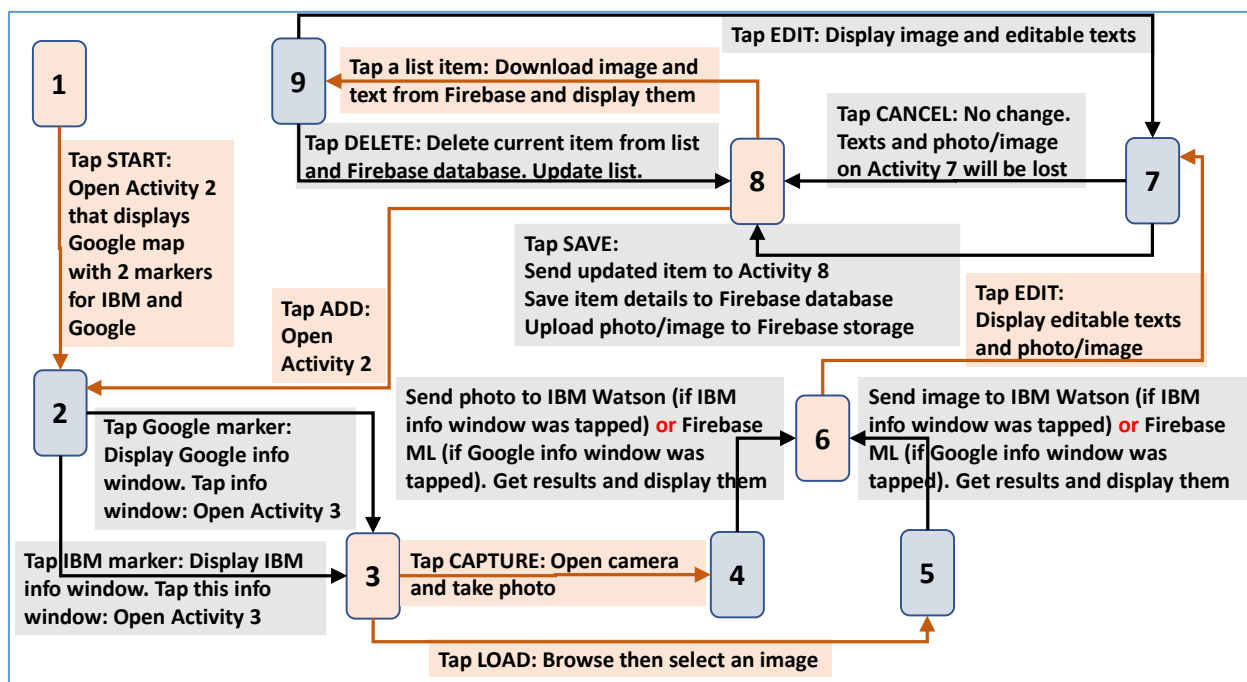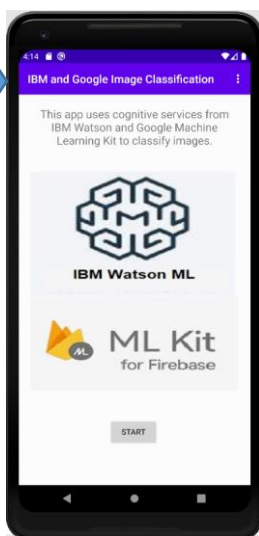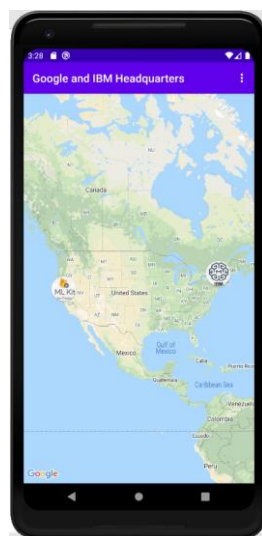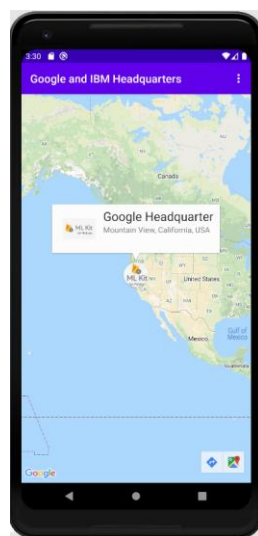

Activity 1   Activity 2   Activity 2 for Google   Activity 2 for IBM

Different Titles
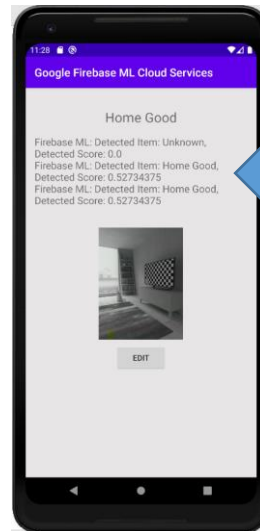
Result must contain "Firebase ML"

Google Firebase: Activity 3   Activity 4   Activity 6

Different Titles
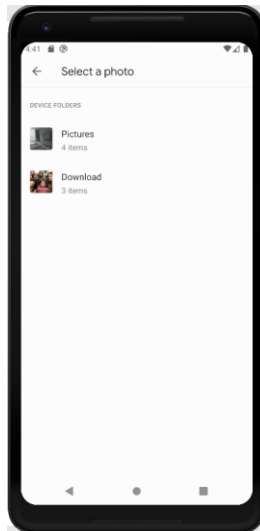
Result must contain "Firebase ML"

Google Firebase: Activity 3   Activity 5   Activity 6

Different Titles
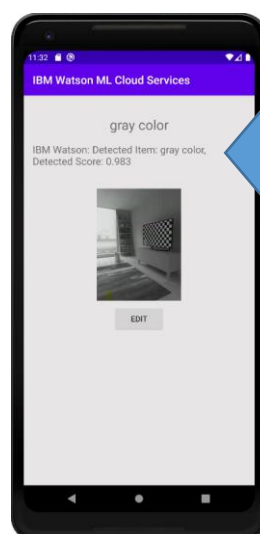
Result must contain "IBM Watson"

IBM Watson: Activity 3   Activity 4   Activity 6

IBM Watson ML Cloud Services

Click Capture to open the Camera and take a picture or Load to choose one of the existing images.

Watson Machine Learning

CAPTURE   LOAD

Select a photo

DEVICE FOLDERS

Pictures
4 items

Download
3 items

IBM Watson ML Cloud Services

kiwi

IBM Watson: Detected Item: kiwi, Detected Score: 0.975

EDIT

IBM Watson: Activity 3   Activity 5   Activity 6

Editing Classification Results

kiwi fruit

IBM Watson: Detected Item: kiwi, Detected Score: 0.975

CANCEL   SAVE

IBM and Google Image Classification

List of Classified Images

Home Good

Food

gray color

kiwi fruit

ADD

IBM and Google Image Classification

kiwi fruit

IBM Watson: Detected Item: kiwi, Detected Score: 0.975

DELETE   EDIT

Activity 7   Activity 8   Activity 9

IBM and Google Imag

This app uses cogn
IBM Watson and
Learning Kit to c

List View

Normal Map

Satellite Map

IBM Watson ML

ML Kit
for Firebase

START

IBM and Google Image Classification

List of Classified Images

Home Good

Food

gray color

kiwi fruit

ADD

Google and IBM Headquarters

Google and IBM Headquarters
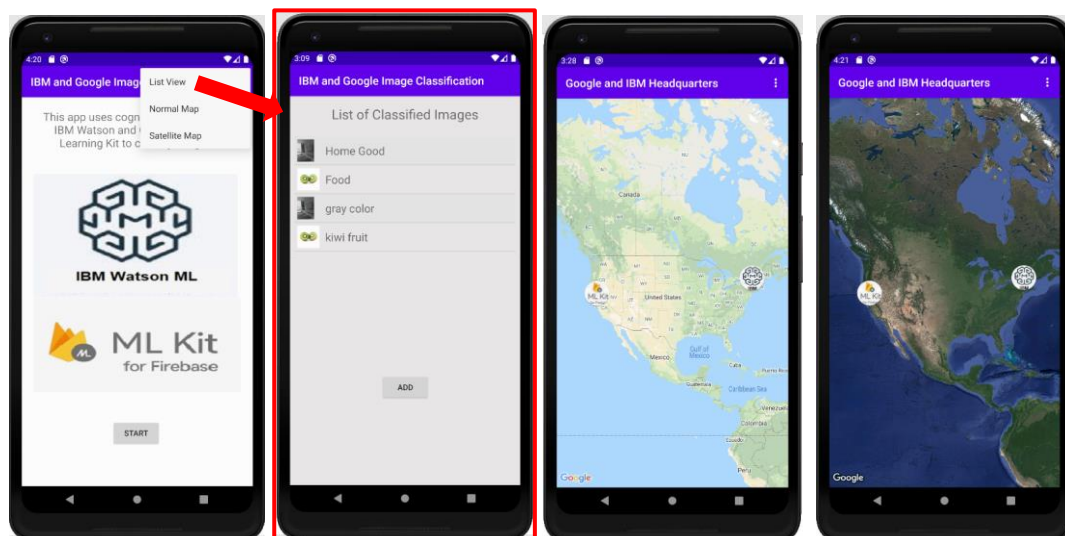
Menu only appears on Activity 1 and Activity 2.

Activity 1: user clicks List View: Activity **8** opens, user clicks Normal or Satellite: no change.

Activity 2: user clicks List View: no change, user clicks Normal or Satellite: map changes accordingly.

Marking Rubric (32 marks)

Zero mark for this task if

a. The compressed file for this project is not found or not able to decompress, or
b. The project can be decompressed but cannot run in Android Studio, or
c. The project can run in Android Studio, but it is not developed from the **Task5** template.

The **Task5** project template contains all files for development. Please **do not add any file or any class to this project** (**–5 marks** for each file or class added) **except the google-services.json file**, and **do not change any filename or class name** (**–5 marks** for each change).

32 marks for the following **(Marks in items h, i, and p are for both Google and IBM)**

a. **Activity 1**: Correct title, content and image. Button: START	1 mark
b. Activity 1: Tap START -> Activity 2 opens	1 mark
c. **Activity 2**: Correct title and display map with 2 markers for Google and IBM	1 mark
d. Activity 2: Tap Google marker -> tap Google info window -> Activity 3 opens	1 mark
e. **Activity 2**: Tap IBM marker -> tap IBM info window -> Activity 3 opens	1 mark
f. **Activity 3**: Correct title, content & image for Google. Buttons: CAPTURE & LOAD	1 mark
g. Activity 3: Correct title, content and image for IBM. Buttons: CAPTURE & LOAD	1 mark
h. Activity 3: Tap CAPTURE -> Camera opens, user takes photo	1 mark
i. Activity 3: Tap LOAD -> user browses and selects an image	1 mark
j. **Activity 4**: No mark	
k. Activity 4: Photo sent to Google Firebase cloud and classification results received	1 mark
l. Activity 4: Photo sent to IBM Watson cloud and classification results received	1 mark
m. **Activity 5**: No mark	
n. Activity 5: Image sent to Google Firebase cloud and classification results received	1 mark
o. Activity 5: Image sent to IBM Watson cloud and classification results received	1 mark
p. **Activity 6**: Correct title, classification results and image. Button: EDIT	1 mark
q. Activity 6: Tap EDIT -> Activity 7 opens	1 mark

r. **Activity 7**:

• Correct title, content and image sent from Activity 6 or Activity 9	1 mark
• Title and content are editable. Buttons: SAVE and CANCEL	1 mark

s. Activity 7: Tap SAVE ->

• Updated item sent to Activity 8	1 mark
• Updated item details saved to Firebase database	1 mark
• Photo/image uploaded to Firebase storage	1 mark

t. Activity 7: Tap CANCEL ->

• Nothing sent to Activity 8. All details of the updated item are lost	1 mark
u. **Activity 8**: Correct title, list view with correct icons and texts, button ADD	1 mark

v. Activity 8: Tap a list item ->

• Item details (text and image) downloaded from Firebase database	1 mark
• Item details then sent to Activity 9	1 mark
w. Activity 8: Tap ADD -> Activity 2 opens	1 mark
x. **Activity 9**: Correct title, content and image for list item. Buttons: DELETE & EDIT	1 mark
y. Activity 9: Tap EDIT -> item details (text and image) sent to Activity 7 for editing	1 mark

z. Activity 9: Tap DELETE ->

• Current item from list and Firebase database deleted. List updated	1 mark

aa. Menu items

• *List View* to open List view (only works when Activity 1 displaying)	1 mark
• *Normal* & *Satellite* to change map (only work when Activity 2 displaying)	1 mark

bb. Report:

• List all screenshots for 9 activities in an emulator	1 mark
• List all screenshots for Firebase database and storage	1 mark
cc. For each exception found at runtime	– 1 mark