Mobile Computing
COMP5216/COMP4216

Project and Exam Preparation

Semester 2, 2023

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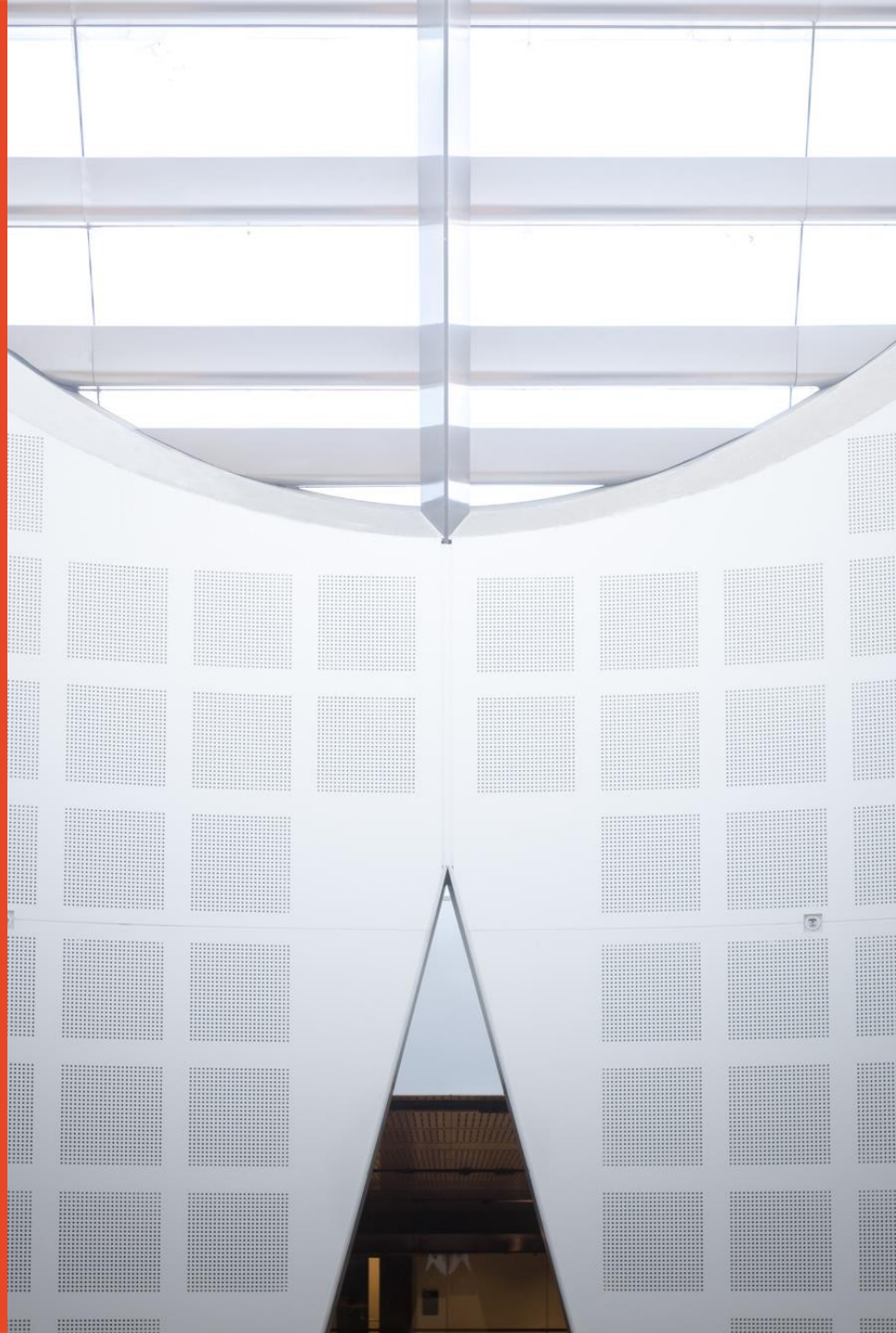
THE UNIVERSITY OF SYDNEY



Group Project Help- Final Phase

- 30 marks
  - 15 Marks during in class presentation and demo
    - Novelty and significance of the problem - 2 Marks
    - Creativity of the solution including proper presentation/demonstration of the solution. - 4 Marks
    - Challenges involved in developing your app and the amount of effort that you have put in developing the final app. - 2 Marks
    - Readiness to distribute the app to users. - 2 Marks
    - Presentation - 2 Marks
    - Demo - 3 Marks
  - 15 Marks offline
    - Source code of the app - 4 Marks
    - Report - 8 Marks
    - Video - 3 Marks

- You are required to implement the app and demo the app through a physical mobile device.

Minimum Feature Set

- Graphical user interface (GUI) to effectively interact with the user.
- At least one form of data communication using either Cellular, WiFi, Bluetooth, etc.
- At least one technique to save network bandwidth usage, computation resource usage and device battery usage.
- At least one method to secure the communication and data storage, or strategy to protect user privacy in handling user data.

Each group member must contribute to the assignment equally and the members will be awarded the same marks. Under certain circumstances, adjustment of marks may happen to group members at the discretion of the course coordinator

Final Report – 8 Marks

- **Validation of app features** - 4 Marks
  - for **each item** in the following minimum feature set, **clearly explain your strategy** and then **provide an experimental validation** that you have managed to successfully implement the proposed techniques
- **Challenges and setbacks –** 2 Marks
  - explain whether you were able to achieve goals proposed at the proposal phase. If not, explain reasons for taking different paths.
- **Documentation and manual -** 1 Mark
  - explain how to set up the working environment to re-compile and re-deploy your app to a mobile device.
- **Appendix -** 1 Mark
  - Workload distribution among group members (With evidence)

Video - 3 marks

- Develop a video to showcase your app to users, and motivating users to download your app.
- It should include the problem
- how your app works and benefits to users.
- .mp4 file format is preferred.
- The video should not be longer than 3 minutes.
- video should be about 100MB

Demo – 3 Marks

- Each group has maximally **2 minutes** after the presentation to demonstrate the key features of the app.
- The app should be installed on a mobile device

It is your responsibility to arrange all technical requirements to successfully demonstrate the key features, e.g. internet access, multiple mobile devices in case of a collaborative app, other supporting devices such as wearables, access to cloud services, etc. prior to the presentation time slot.

Novelty and significance of the problem

- Show a comparison
- Show facts, research findings

Browser comparison

	CHROME	EDGE	FIREFOX	SAFARI
OPEN SOURCE	No	Partially	Yes	No

Security and Privacy							
Private Browsing mode	✓	✓	✓	✓	✓	✓	✓
Blocks third-party tracking cookies by default	✓	—	✓	✓	✓	✓	✓
Blocks cryptomining scripts	✓	—	✓	—	✓	✓	—
Blocks social trackers	✓	—	✓	✓	—	✓	—

FACTS ABOUT THE FINANCIAL LITERACY OF AMERICA'S YOUTH

ONLY **24%** **OF MILLENNIALS** SURVEYED SHOWED BASIC FINANCIAL LITERACY, WITH ONLY 8% SHOWING A HIGH LEVEL OF KNOWLEDGE.[1]

YET **69%** **BELIEVED** THEY HAD HIGH FINANCIAL KNOWLEDGE.[1]

ABOUT **1 IN 5** **TEENS** HAVE A CREDIT CARD AS AN AUTHORIZED USER ON A GUARDIAN'S ACCOUNT.[3]

ONLY **58%** **OF GENERATION Z** (POST-MILLENNIAL) TEENS CONSIDER WHETHER OR NOT THEY HAVE ENOUGH MONEY SAVED BEFORE THEY MAKE A PURCHASE.[3]

ABOUT **1 OUT OF 10** OF SURVEYED **GEN Z** STUDENT LOAN BORROWERS BELIEVE (FALSELY) THAT YOU DON'T NEED TO REPAY YOUR LOANS IF YOU CAN'T FIND A JOB AFTER COLLEGE.[4]

ALSO, **52%** **OF BORROWERS** BELIEVE (FALSELY) THAT INTEREST DOESN'T ACCRUE ON UNSUBSIDIZED LOANS WHILE THEY'RE IN SCHOOL.[4]

IN JUST ONE DECADE, STUDENT LOAN BALANCES HAVE JUMPED **150%**[2]

BUT **GEN Z** IS GENERALLY MORE RISK-AVERSE, WITH **1 OUT OF 5** SURVEYED RESPONDENTS SAYING **DEBT SHOULD BE AVOIDED "AT ALL COSTS."**[5]

Sources

[1] https://www.nefe.org/Press-Room/News/Millennials-Gap-Between-Confidence-and-Knowledge
[2] https://www.cnbc.com/2017/08/29/student-loan-balances-jump-nearly-150-percent-in-a-decade.html
[3] https://www.transunion.com/docs/TUC_GenZReport_FINAL_06.22.17_US%5b2%5d.pdf
[4] https://studentloanhero.com/featured/survey-majority-student-loan-borrowers-know-interest-forgiveness-works/
[5] https://www.levo.com/posts/the-surprising-financial-habits-of-gen-z

COUPON FOLLOW

BusyKid
Allowance Simplified.

BusyKid asked parents about chores and how much their kids know about money, and here's what they had to say:

90% reported they did chores as a kid

60% required their own kids to do chores

33% said their kids learn about personal finance in school

60% said their kids have a savings account and only 44% put money into it regularly

10% think it is important to teach kids how to manage credit cards and only 10% think kids need to learn how to invest

21% are regularly talking to their kids about their money situation. A little over half of parents talk about it sometimes

350 parents responded

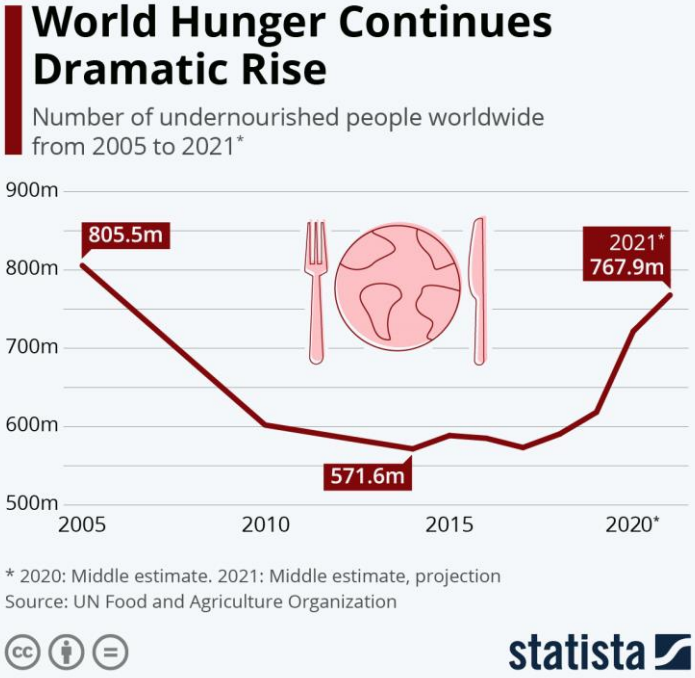
According to the Survey of States by the Council for Economic Education:

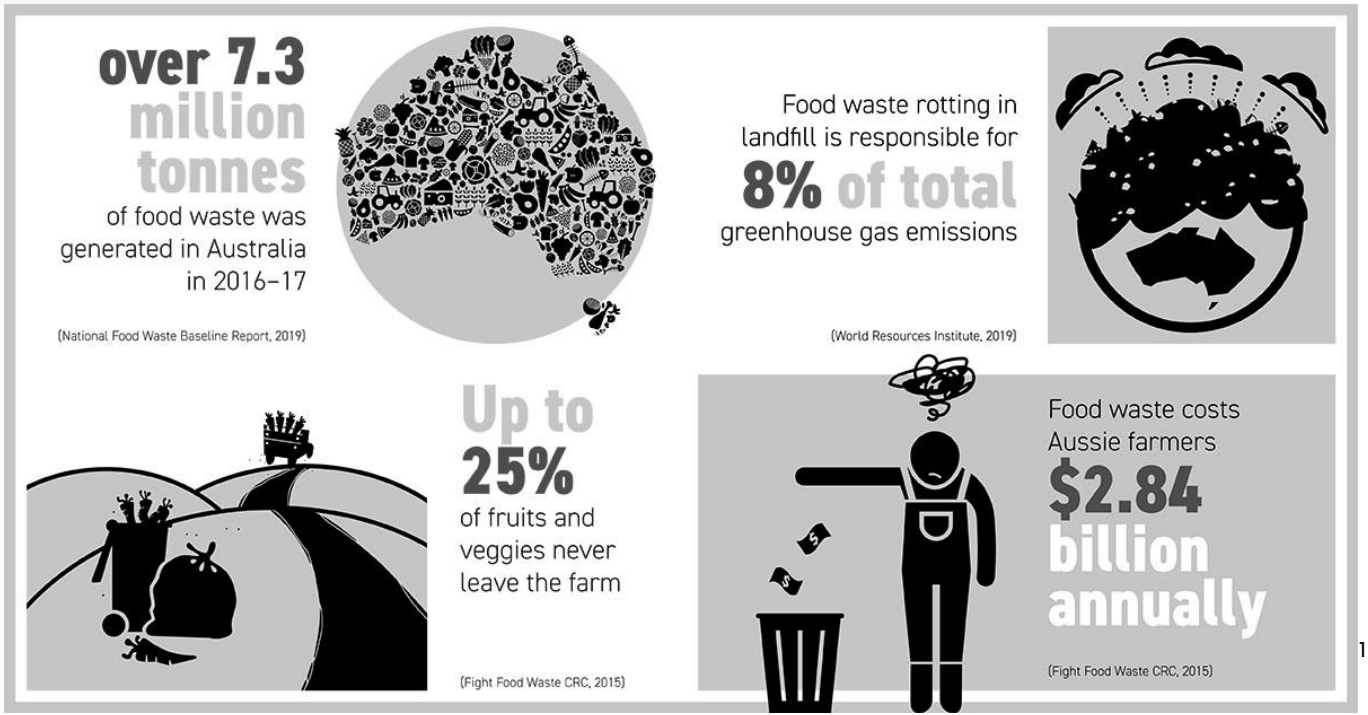
ZERO Since 2016, not one single state added personal finance to their k-12 standards

22 States require high school students to take a course in economics

17 States require high school students to take a course in personal finance

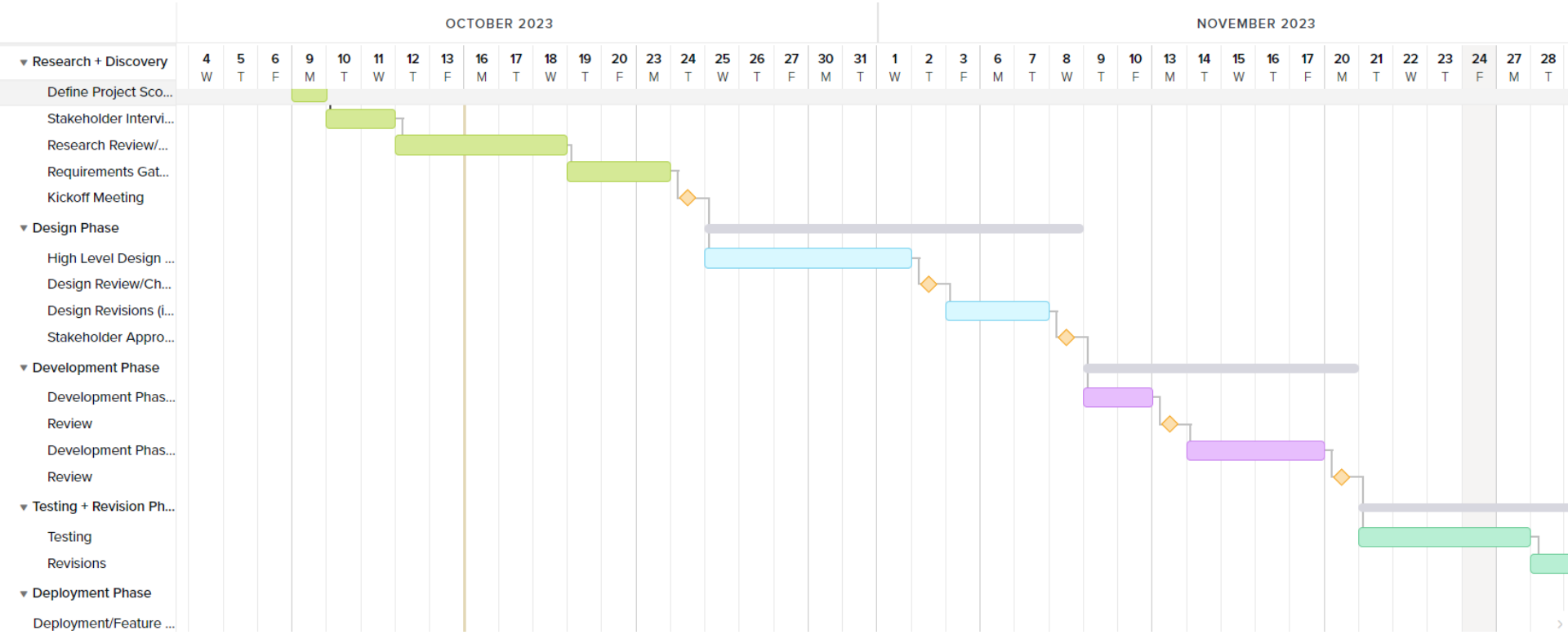
ZERO There has been no change since 2014 in the number of states that require standardized testing of economic concepts. The number remains at 16


World Hunger Continues Dramatic Rise
Number of undernourished people worldwide from 2005 to 2021*
900m
800m
700m
600m
500m
805.5m
571.6m
2021* 767.9m
2005
2010
2015
2020*
* 2020: Middle estimate. 2021: Middle estimate, projection
Source: UN Food and Agriculture Organization
statista


over 7.3 million tonnes
of food waste was generated in Australia in 2016–17
(National Food Waste Baseline Report, 2019)
Food waste rotting in landfill is responsible for 8% of total greenhouse gas emissions
(World Resources Institute, 2019)
Up to 25% of fruits and veggies never leave the farm
(Fight Food Waste CRC, 2015)
Food waste costs Aussie farmers $2.84 billion annually
(Fight Food Waste CRC, 2015)

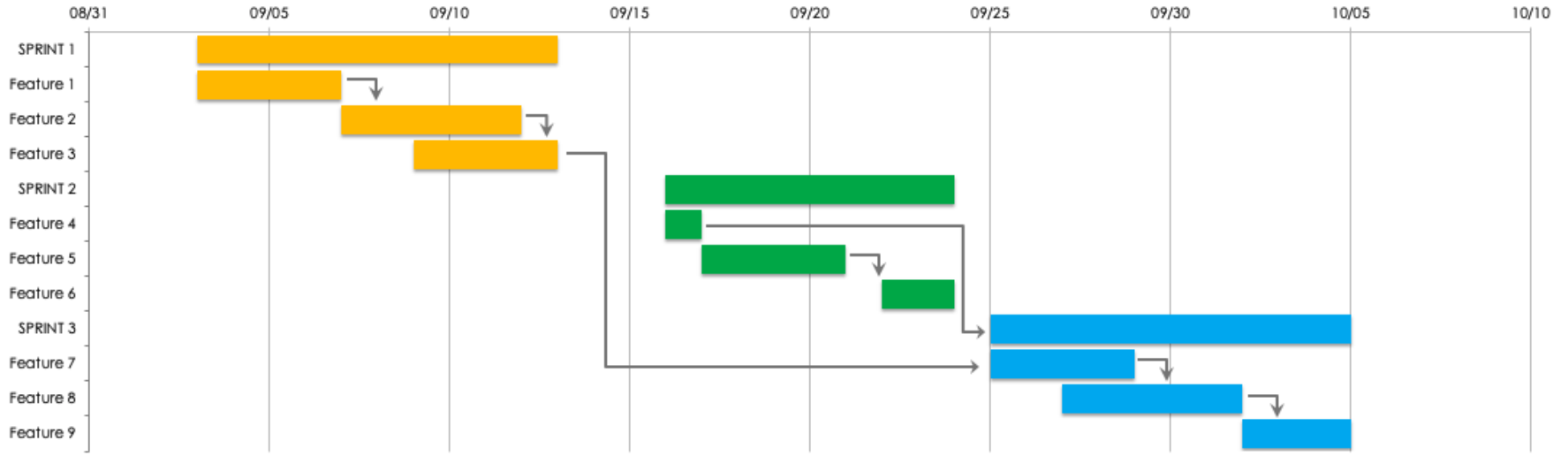
Readiness to distribute the app to users – 2 Marks

Adding a Gantt chart



PROJECT NAME	Product Release	START DATE	END DATE	OVERALL PROGRESS	PROJECT DELIVERABLE	
PROJECT MANAGER	Alex B.	09/02	10/10	35%	SCOPE STATEMENT	

AT RISK	TASK NAME	FEATURE TYPE	RESPONSIBLE	STORY POINTS	START	FINISH	DURATION in days	STATUS	COMMENTS
☐	SPRINT 1		Alex B.		09/03	09/13	10	Complete	
☐	Feature 1		Frank C.		09/03	09/07	4	Complete	
☐	Feature 2		Jacob S.		09/07	09/12	5	Complete	
☑	Feature 3		Jacob S.		09/09	09/13	4	Complete	
☐	SPRINT 2		Jacob S.		09/16	09/24	8	In Progress	
☐	Feature 4		Alex B.		09/16	09/17	1	In Progress	
☐	Feature 5		Frank C.		09/17	09/21	4	Overdue	
☑	Feature 6		Shari W.		09/22	09/24	2	On Hold	
☐	SPRINT 3		Shari W.		09/25	10/05	10	Not Started	
☐	Feature 7		Alex B.		09/25	09/29	4	Not Started	
☐	Feature 8		Kennedy K.		09/27	10/02	5	Not Started	
☐	Feature 9		Jacob S.		10/02	10/05	3	Not Started	



PLAGIARISM is where you use the work of another person and present it as your own. This is **STRICTLY PROHIBITED. Text-based similarity detecting software (e.g., Turnitin) will be used for all text-based written assignments and source codes. It is your responsibility to understand the Academic Honesty policies of the University of Sydney.**

Final Exam

- 5 Questions
- Short and long descriptive answers.
- Please effectively use the space provided.

- Questions categories:
  - **Short**
  - **Long**
  - **Design**

What to expect from the final exam ?

Week	Lectures
1	Introduction
2	App Development Workflow
3	Android Programming Basics - 1
4	Android Programming Basics - II
5	Smartphone capabilities and sensors
6	Challenges in Mobile Computing - UX
7	Challenges in Mobile Computing - Network
8	Challenges in Mobile Computing – Energy and Computation
9	Public Holiday
10	Guest Lecture – Cross-Platform
11	Project & Exam Preparation + Course Review
12	Demo Day
13	Model Paper

Lecture 02: App Development Workflows

Six Steps

1. Define Goals
2. Analyse Requirements
3. Design Workflow: sketch UI, wireframe or storyboard
4. Design project structure
5. Implement codes
6. Test, debug, and release

BUSINESS MODEL CANVAS - NETFLIX

The Power MBA

KEY PARTNERS

Internet service providers (ISP)

3rd party studios

KEY ACTIVITIES

Content procurement

Application development

3rd party licensing

KEY RESOURCES

Streaming rights

Internet bandwidth

Recommendation algorithm

Content library

VALUE PROPOSITIONS

On-demand video

Huge selection of content

Original content

Competitive price point

CUSTOMER RELATIONSHIPS

Self-service platform

CHANNELS

Website

App store

Affiliate partners

CUSTOMER SEGMENTS

Mass market

COST

In-house content production
3rd party licensing
Streaming application (staff, maintenance, etc,.)

REVENUE STREAMS

Subscriptions

Lecture 03 & 04: Android Programming Basics – I & II

App components

- **Activities**
- Services
- Broadcast Receivers
- Content Providers

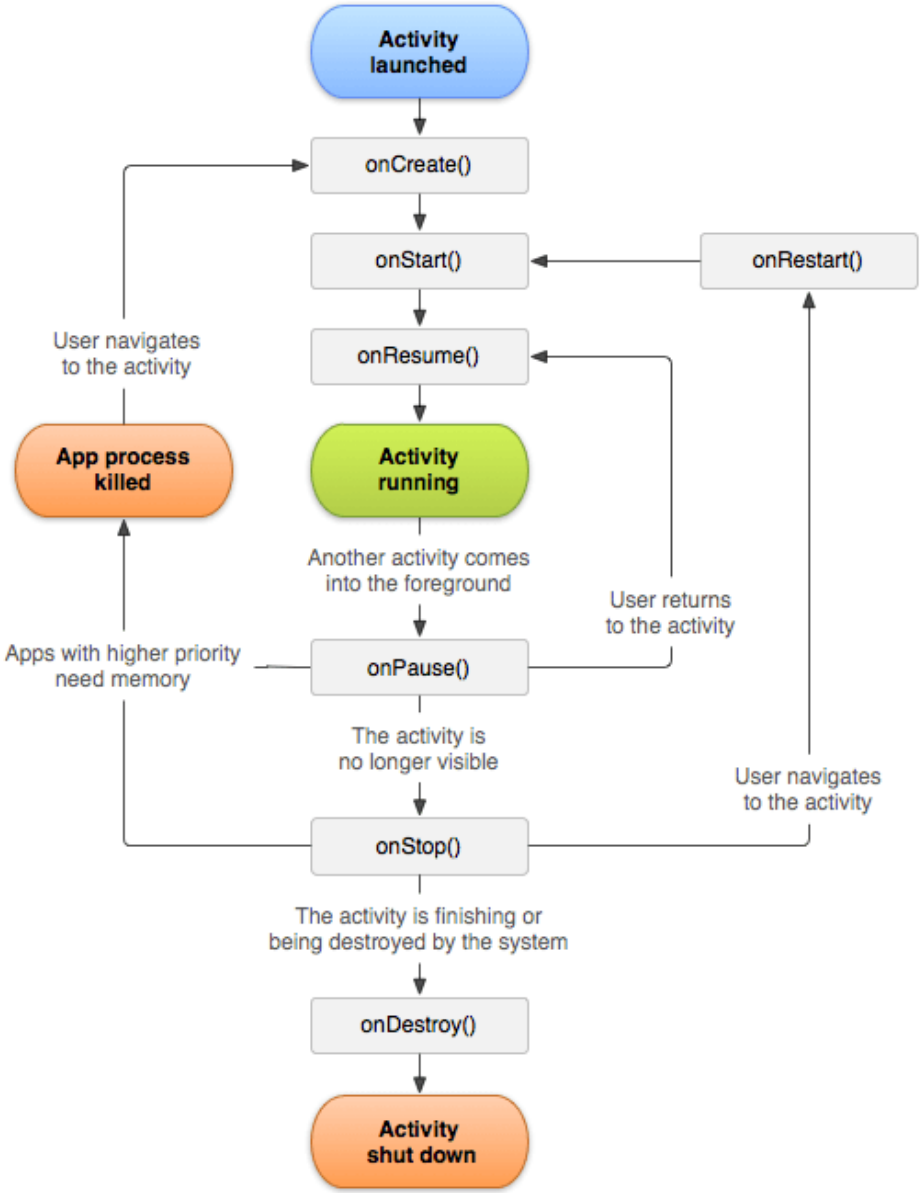
Activating components

- **Intent**

```
Intent intent = new Intent(FirstActivtiy.this, SecondActivity.class);
startActivity(intent);
```

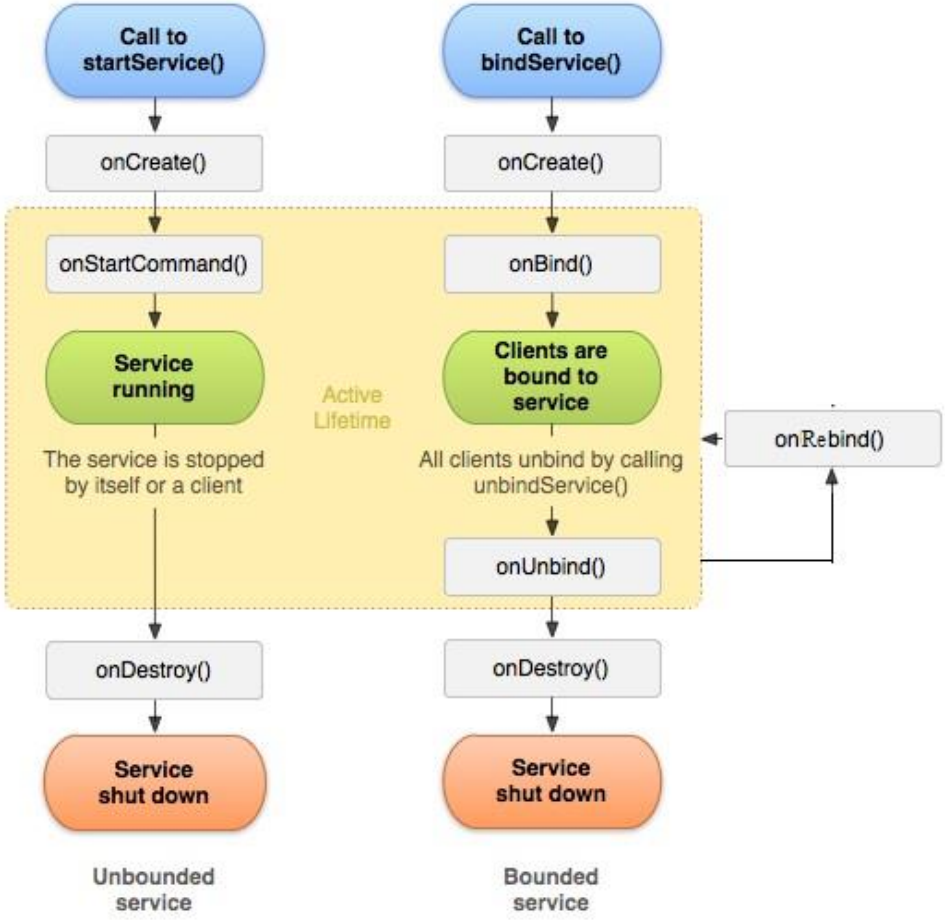
```
Intent intent = new Intent();
intent.setAction(android.content.Intent.ACTION_VIEW);
intent.setData(Contract.Contacts.CONTENT_URL);
startActivity(intent);
```

Activity Lifecycle



Services

- Three types of services:
  - **Foreground**
  - **Background**
  - **Bound**



Lecture 05: Smartphone capabilities and sensors

– Sensor Framework

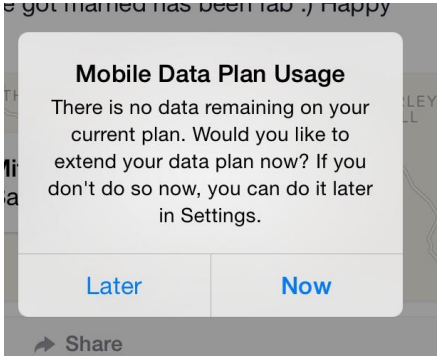
- Motion sensors: These sensors measure acceleration forces and rotational forces along three axes.
- Environmental sensors: These sensors measure various environmental parameters
- Position sensors: These sensors measure the physical position of a device.

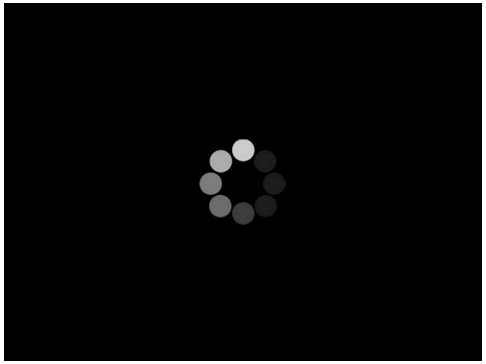
– Explain a technique that can be used to implement the following functionalities in an Android app. If the proposed technique involves collecting data from a sensor or leveraging an API, those should be explicitly specified.

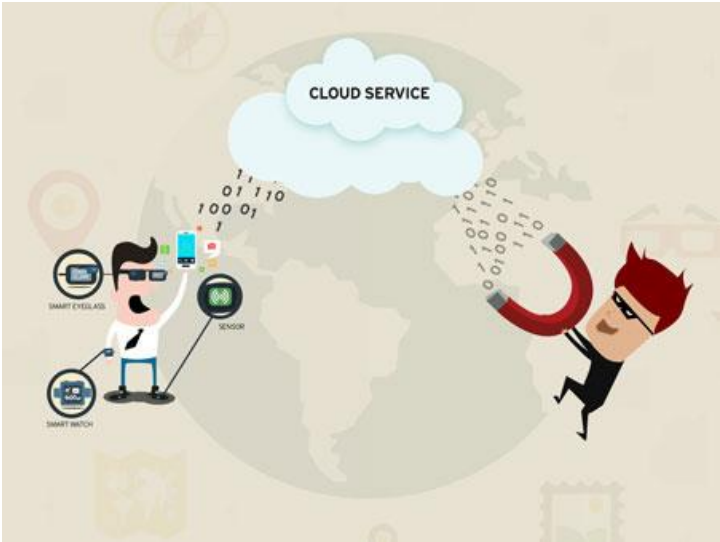
1. Dim the screen when a user puts the phone inside a pocket or a handbag.
2. Count the number of steps a person has climbed during the day.
3. Detect whether a person is indoors or outdoors.
4. Measure the size of physical objects or distances in the vicinity.

Lectures 6, 7,8 and 9 : Challenges in Mobile Computing

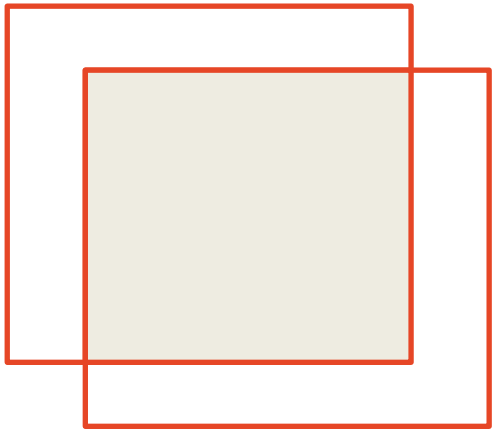
- UX
- Location
- Network
- Energy and Computation
- Security

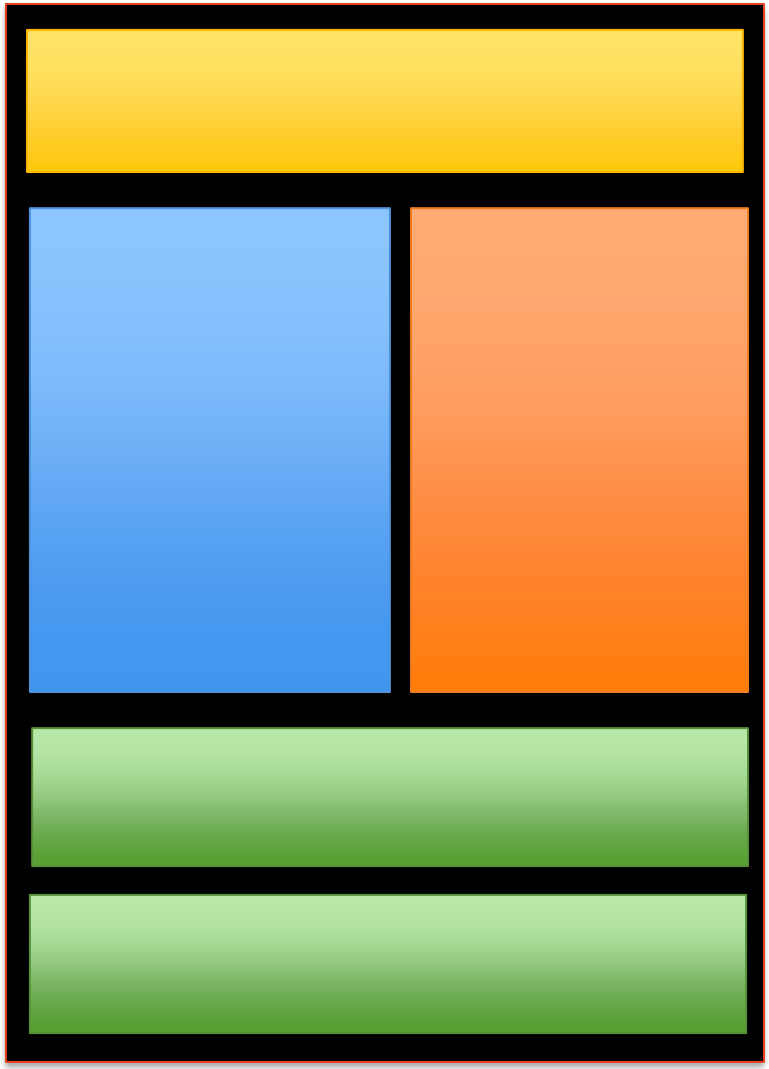






You started a new job at a startup who owns one of the public transport app in Sydney that leverages Transport NSW public APIs to access real-time updates for the status of public transport network. Customers have complained that this app is unusually at the top of bandwidth usage and battery usage lists. As a student who followed this course, what are the checks/verifications you suggest to perform ?





OVERDRAW is a term used to describe how many times a pixel has been re-drawn in a single frame of rendering. It's a troublesome issue, because in most cases, pixels that are overdrawn do not end up contributing to the final rendered image. As such, it amounts to wasted work for your GPU and CPU.

Course Outcomes

Expectations

- COMP5216 is not a programming course.
- Pre-requisites
  - Knowledge in a high-level programming language
  - Android programming is based on JAVA
    - Many books in the university library
    - External resources
      - https://itunes.apple.com/us/itunes-u/introduction-to-programming/id548675644
      - https://www.udemy.com/java-tutorial/
      - https://itunes.apple.com/us/course/introduction-to-java/id551000192
  - Kotlin Resources
    - https://developer.android.com/courses/pathways/android-basics-kotlin-one

- To understand **Concepts and Principles**
- To be skillful in **Programming**
- To practice **Problem Solving**
- To be **Creative**

Outcomes

- Pursue your passion
- Exercise your creativity
- Gain rewarding experiences
- Understand mobile computing techniques
- Thorough knowledge of mobile app based eco-system

At the end of the course;

- You will be able to develop your own mobile app
- May be you will be able to publish it in the app store
- May be you will be able to start your own business
- Participate and win an App Competition

- Knowledge and experience in mobile computing will be useful;
  - For your final year thesis project
  - To improve your productivity
  - Pursue your passion as a hobby
  - Just for Fun !
  - **Improve your chances of getting a better job**

It's time for you to support me…!

- https://student-surveys.sydney.edu.au/
- Please take 10 minutes to complete the USS survey.

Your Unit of Study Survey (USS) feedback is **confidential**.

It's a way to share what you enjoyed and found most useful in your learning, and to provide constructive feedback. It's also a way to 'pay it forward' for the students coming behind you, so that their **learning experience** in this class is as good, or even better, than your own.

When you complete your USS survey (https://student-surveys.sydney.edu.au), please:

Be specific.
Which class tasks, assessments or other activities helped you to learn? *Why* were they helpful? Which one(s) *didn't* help you to learn? *Why* didn't they work for you?

Be constructive.
What practical changes can you suggest to class tasks, assessments or other activities, to help the next class learn better?

Be relevant.
Imagine you are the teacher. What sort of feedback would you find most useful to help make your teaching more effective?

Thank You !

- Remember – Project Presentations
  - 23/11/2023 **5:00 pm onwards**
- **Good Luck !**