

Digital Solutions

Unit 1

Creating with Code

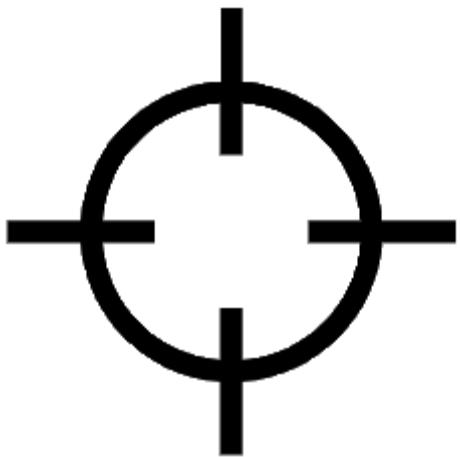
3. Developing User Experiences and Interfaces

- 3.1 Determining the scope of a solution
- 3.2 Developing the user interface
- 3.3 Identifying key algorithms

LEARNING GOALS

WALT	WILF	TIB
<ul style="list-style-type: none">▪ Examine a problem to determine achievable outcomes within set deadlines.▪ Determine features to include in an app▪ Communicate planning for an app through a detailed mind map	<ul style="list-style-type: none">▪ Whole class will work through exploring and developing a hypothetical app.▪ Students will create a detailed mind map of an app concept.▪ Students will discuss the difference between an app goal and a user goal.	<ul style="list-style-type: none">▪ Technologies have been an integral part of society for as long as humans have had the desire to create solutions to improve their own and others' quality of life.▪ Technologies have an impact on people and societies by transforming, restoring and sustaining the world in which we live.

3.1 Determining the scope of a solution



- Activity 3.1
Café Loco



- Brainstorming
App Goals
User Goals



- Mapping out an app concept



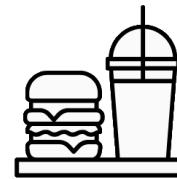
- Activity 3.2
Managing schedules



- Creating criteria lists

WALT

- Examine a problem to determine achievable outcomes within set deadlines.
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Activity 3.1 A – Café Loco



WILF

- Whole class will work through exploring and developing a hypothetical app.
- Students will create a detailed mind map of an app concept.
- Students will discuss the difference between an app goal and a user goal.

Café Loco would like to offer its customers an easy and convenient way to order lunch deliveries on mobile devices.

Use the problem-solving process to explore and develop an app suitable for Café Loco.

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Brainstorming

Who are Café Loco's users?

Consumers...

Like variety in meal options

Time poor

18 – 65 +

Interested in healthy options

Like the convenience of quick and accessible meals.

Possibly:

Unable to travel (disability, illness, lack of transportation)

Works late or unusual hours

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Brainstorming

What features should the app have?

Menu/s (food, drinks, snacks)	Easy to order
Favourite order	Pictures of menu items
Surprise me order	No extra downloads (PDFs)
Map location	Select delivery times
Eco friendly packaging	Pickup notification
Payment	Delivery notification
BYO container	Allergy alerts
Group order	Save profile for future orders
Star rating	Proximity order
Nutritional Information	
Loyalty rewards	

This is a presented list of ideas – Does your application need to incorporate *all* of these? – No.

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What features are important to the user?

- | | |
|--|--------------------------------|
| ● Menu/s (food, drinks, snacks) | ● Easy to order |
| Favourite order | Pictures of menu items |
| Surprise me order | No extra downloads (PDFs) |
| ● Map location | ● Select delivery times |
| Eco friendly packaging | Pickup notification |
| ● Payment | ● Delivery notification |
| BYO container | Save profile for future orders |
| Group order | ● Allergy alerts |
| Star rating | Proximity order |
| ● Nutritional Information | |
| Loyalty rewards | |

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What features are important to the app?

● Menu/s (food, drinks, snacks)

Favourite order

Surprise me order

● Map location

Eco friendly packaging

● Payment

BYO container

Group order

Star rating

● Nutritional Information

Loyalty rewards

● Easy to order

Pictures of menu items

No extra downloads (PDFs)

● Select delivery times

Pickup notification

Delivery notification

Save profile for future orders

● Allergy alerts

Proximity order

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Minimum Viable Product (MVP)

- | | |
|-----------------------------------|--------------------------------|
| ● ● Menu/s (food, drinks, snacks) | ● ● Easy to order |
| Favourite order | ● Pictures of menu items |
| Surprise me order | No extra downloads (PDFs) |
| ● ● Map location | ● ● Select delivery times |
| Eco friendly packaging | ● Pickup notification |
| ● ● Payment | ● Delivery notification |
| BYO container | Save profile for future orders |
| Group order | ● ● Allergy alerts |
| Star rating | Proximity order |
| ● ● Nutritional Information | |
| Loyalty rewards | |

We combine our selected items from user and app.

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Activity 3.1 B – Café Loco Mind Map

Use the following slides to build a mind map for the Café Loco app using XMind (slides 10 – 15).

You do not need to add the data branches (slide 18, 19) for Café Loco. You will use the data branches in all assignments except FIA1. They have only been provided as an example of what to include in the future.



XMind

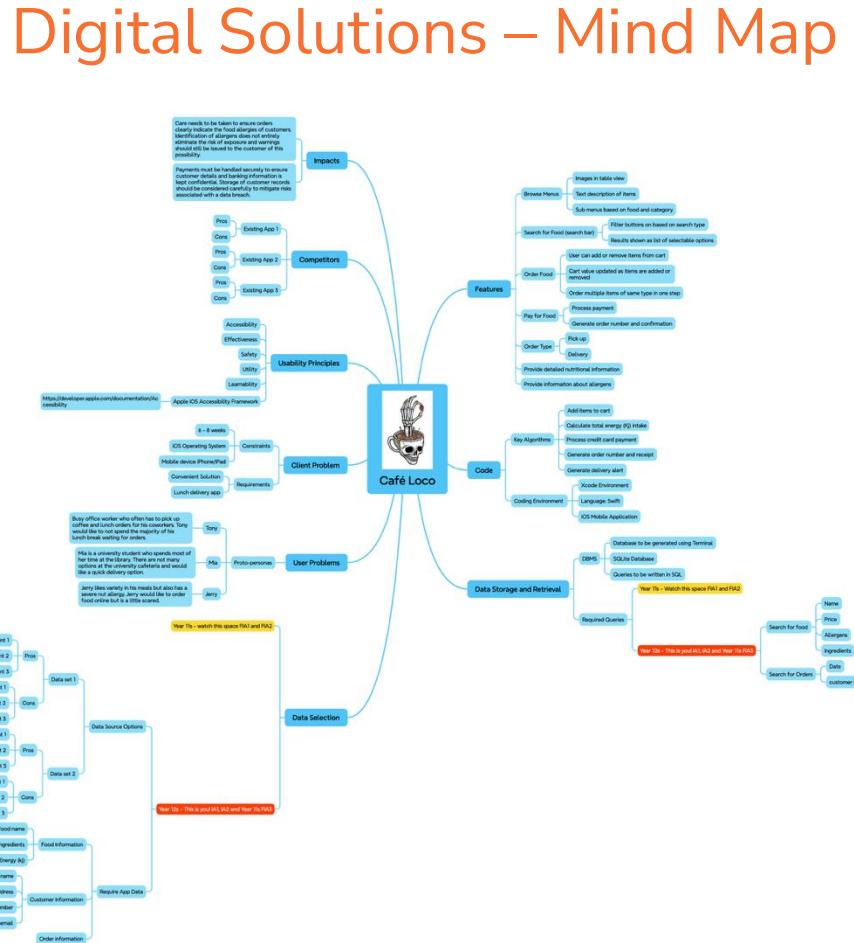
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WALT

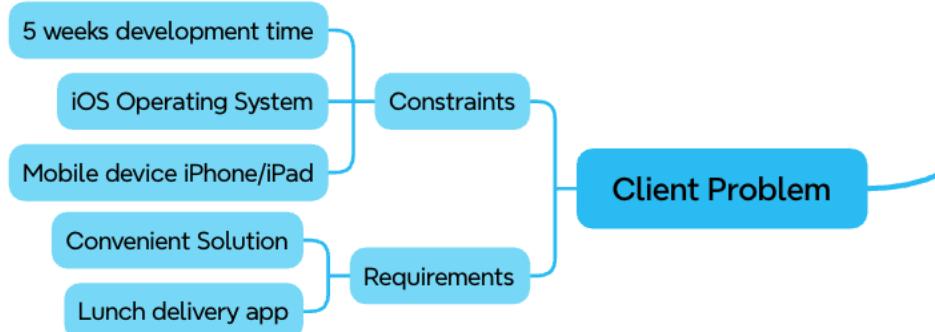
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Client Problem



WALT

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User Problems

(Create your own proto-personas in FIA1 & IA1)

Busy office worker who often has to pick up coffee and lunch orders for his coworkers. Tony would like to not spend the majority of his lunch break waiting for orders.

Mia is a university student who spends most of her time at the library. There are not many options at the university cafeteria and would like a quick delivery option.

Jerry likes variety in his meals but also has a severe nut allergy. Jerry would like to order food online but is a little scared.

Tony

Mia

Jerry

Proto-personas

User Problems

WILF

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WALT

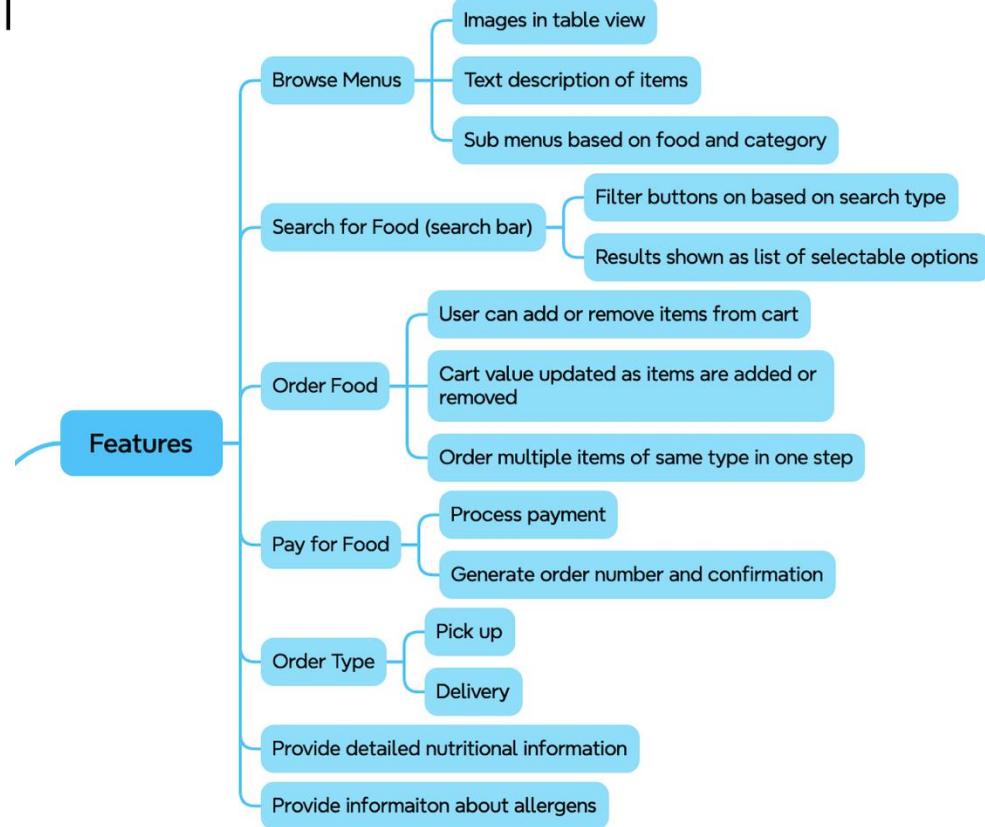
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Features



WALT

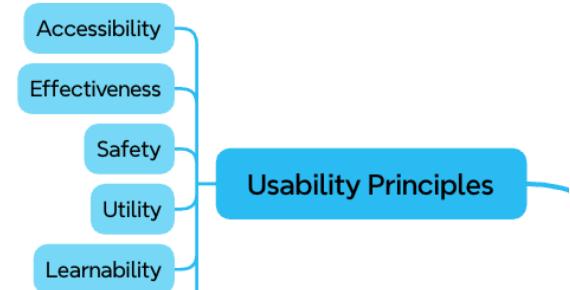
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Usability Principles



<https://developer.apple.com/documentation/Accessibility>

Apple iOS Accessibility Framework

WALT

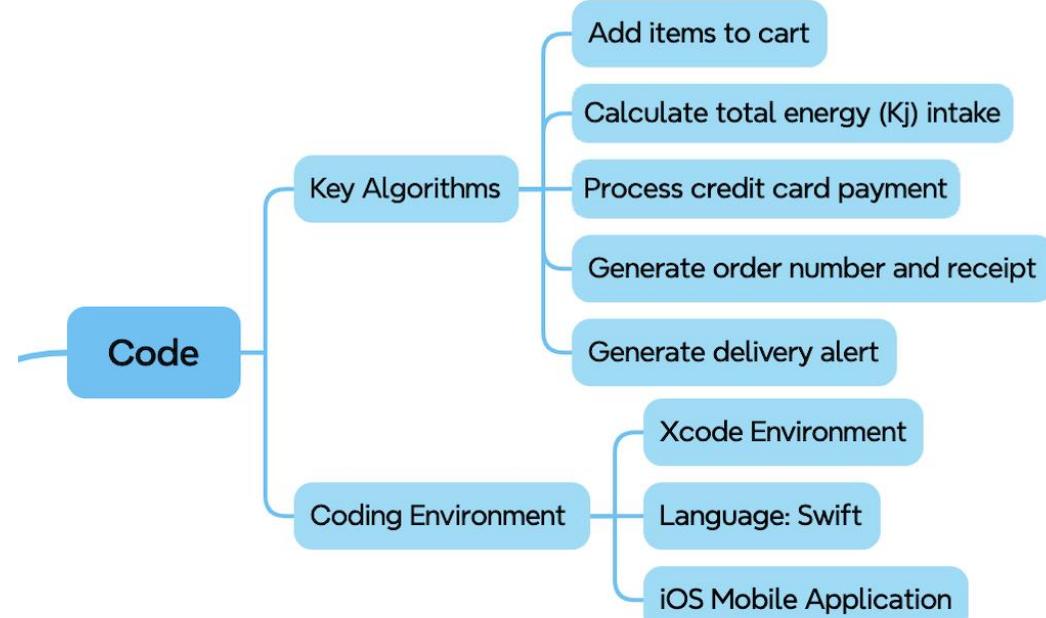
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Code



NOTE: Key Algorithms are expected 'calculations' your application will have to perform in order to function. E.g. calculating the total cost of an order with multiple items.

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Impacts

Care needs to be taken to ensure orders clearly indicate the food allergies of customers. Identification of allergens does not entirely eliminate the risk of exposure and warnings should still be issued to the customer of this possibility.

Payments must be handled securely to ensure customer details and banking information is kept confidential. Storage of customer records should be considered carefully to mitigate risks associated with a data breach.

Impacts

NOTE: It is important to explore the three main categories of impacts within your mind map - Personal, Social and Economic.
Only focus on the positives – if you identify a problem, provide the solution!

WALT

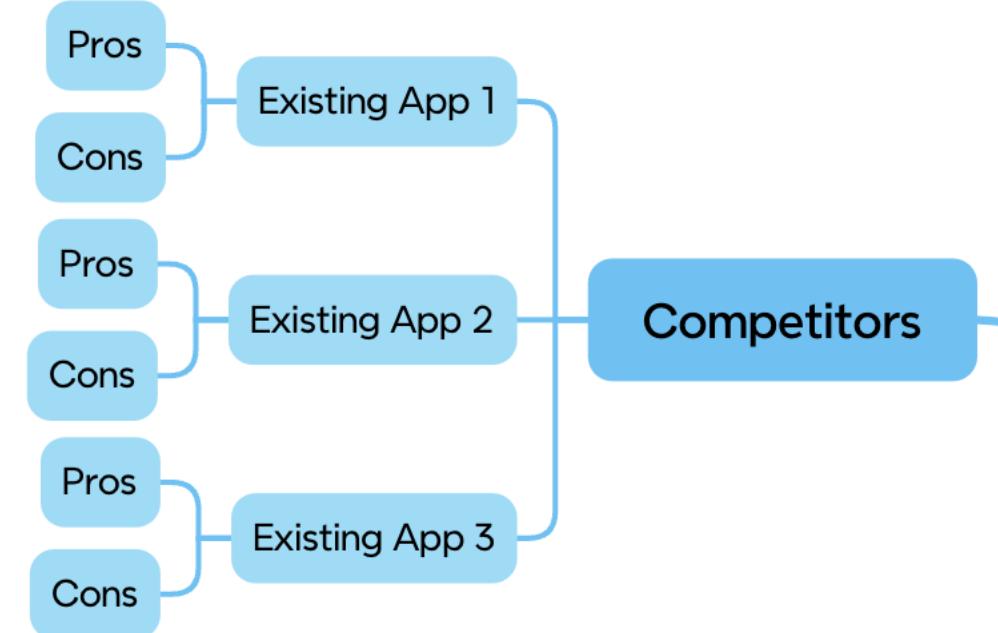
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Competitors



WALT

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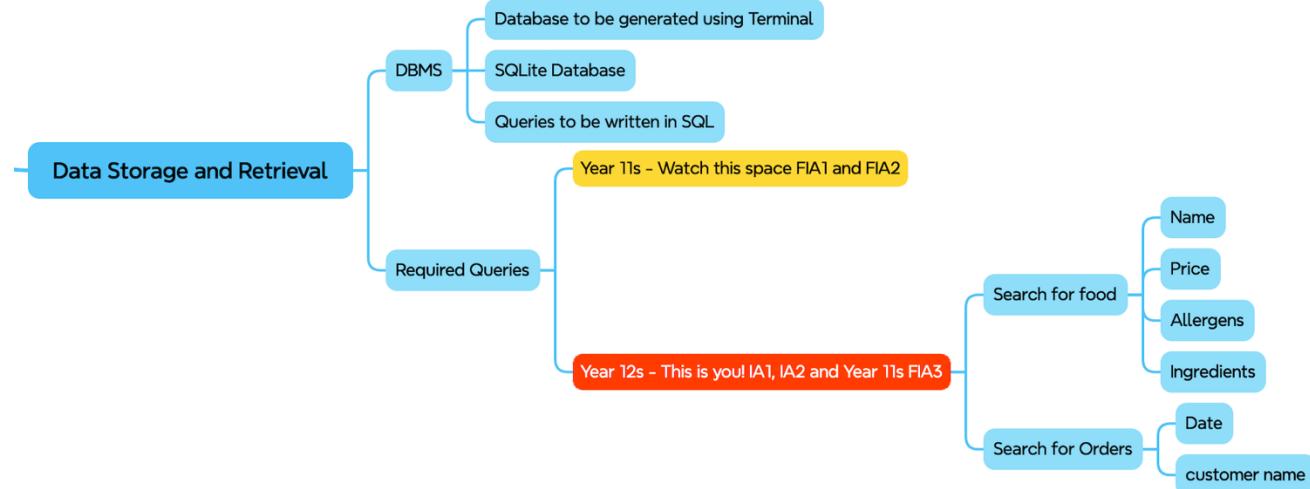


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Data Storage and Retrieval

(not needed for FIA1)



DO NOT ADD TO
CAFÉ LOCO MIND
MAP

WALT

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Data Selection

(not needed for FIA1)

**DO NOT ADD TO
CAFÉ LOCO MIND
MAP**



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Activity 3.1 D – Creating Success Criteria

Separate the criteria list into four categories:

Features

Usability

Impacts

Programming

Under each heading generate a specific dot point, bullet point or check box for your Café Loco example.

E.g. Features

- User must be able to order menu items
- ✓ User must be able to order menu items
- ❑ User must be able to order menu items

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CAFÉ LOCO Success Criteria

Features

- User must be able to order menu items
- Menu must have photos of popular meals
- User must be able to see location of store on Google maps
- Must be able to calculate invoice amount for orders
- Must be able to process payments
- Must be able to generate and send payment receipts
- Menu provides accurate nutritional Information
- User must be able to provide allergy alerts
- User can select delivery time
- User can choose to pick up order
- User must receive delivery and pickup notifications
- Must collect user details (name, address, contact information)
- Must be easy to navigate and quick to order
- User must be able to access help



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CAFÉ LOCO Success Criteria

Usability (Accessibility, Effectiveness, Safety, Utility, Learnability)

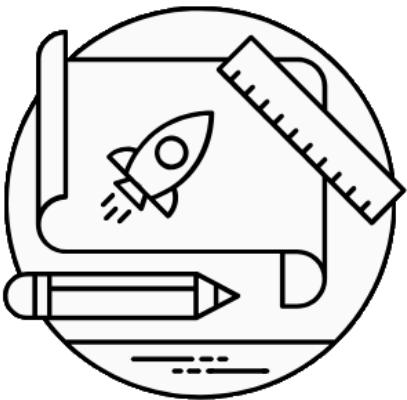
- Inclusive language and terms
- Notifications should give user sense of accomplishment. Design dialogs to yield closure
- Layout must be consistent, simplistic and feel intuitive to the user
- Restrict invalid user input by using drop down boxes when ordering menu items
- Menu must be accessible and prominent on main launch screen
- User can access help on how to order through prominent help button
- Help instructions are simplistic and easy to follow
- Payments to be processed through secure connection, padlock icon to reassure user

Impacts (Personal, Social and Economic)

- It is essential that users can access meals suitable for their dietary requirements. Users will feel at ease knowing that they can avoid life threatening reactions to allergens
- Customers need to feel their data is secure when making payments online. Failure to secure data could have legal ramifications and affect the good name of business. As a result Café Loco's customer base and profit are at risk of being compromised



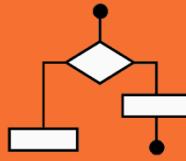
3.2 Prototyping a solution



- Sketching user interfaces



- Annotation



- Algorithms and pseudocode

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Sketching user interfaces (UI)

Common Elements

We will be using this iPhone wireframe to develop our user interface for Café Loco.



A copy of the wireframe is available in QLearn



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Sketching user interfaces (UI)

You must include:

Title - The title will help you understand what you are looking at and whether or not the sketch is relevant. This is especially useful if you have a lot of sketches.

Annotations - Annotations are names and notes placed close to an element, to explain its content or other attributes. They add details that clarify other elements, and are usually difficult to draw. For example, it could be the name of the block, some interaction details, an explanation of a picture, some ideas for future design variations, etc.

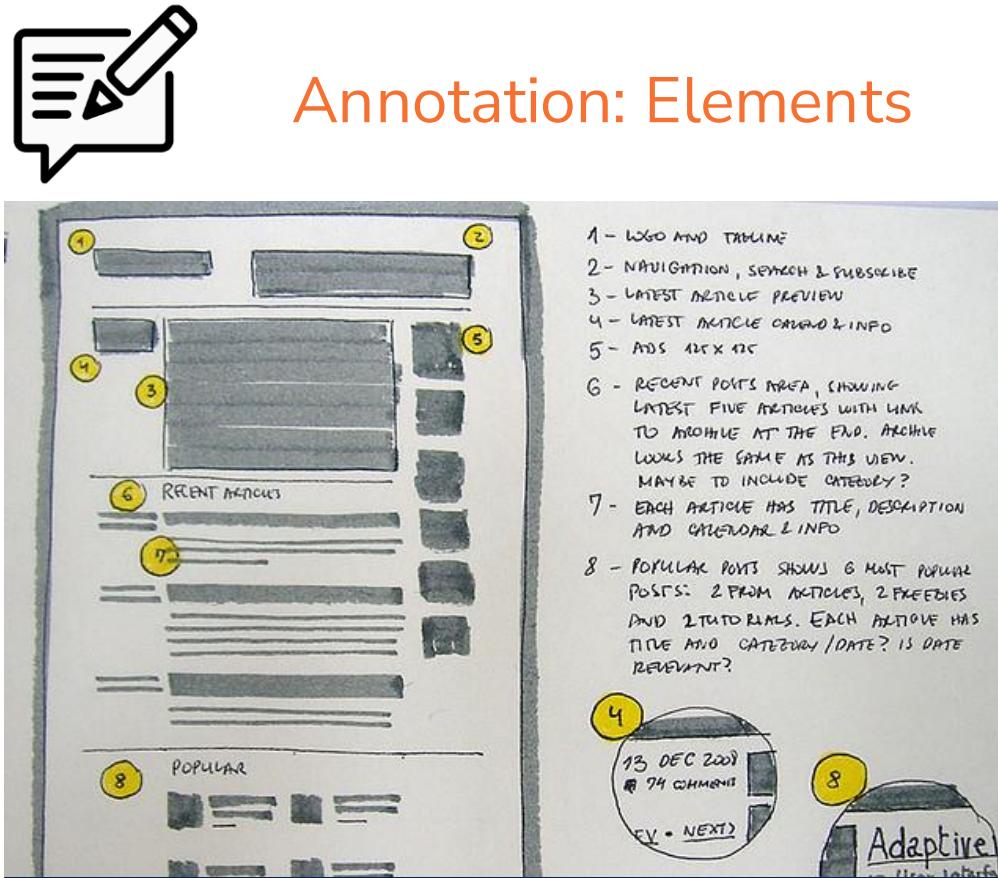
Notes - Use the extra space at the bottom of the wireframe to explain how you have integrated usability principles for each screen. The common elements section is where you would add notes that apply to all screens.

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Number the elements of your sketch if space is limited. Use a legend to explain elements in more detail.

WALT

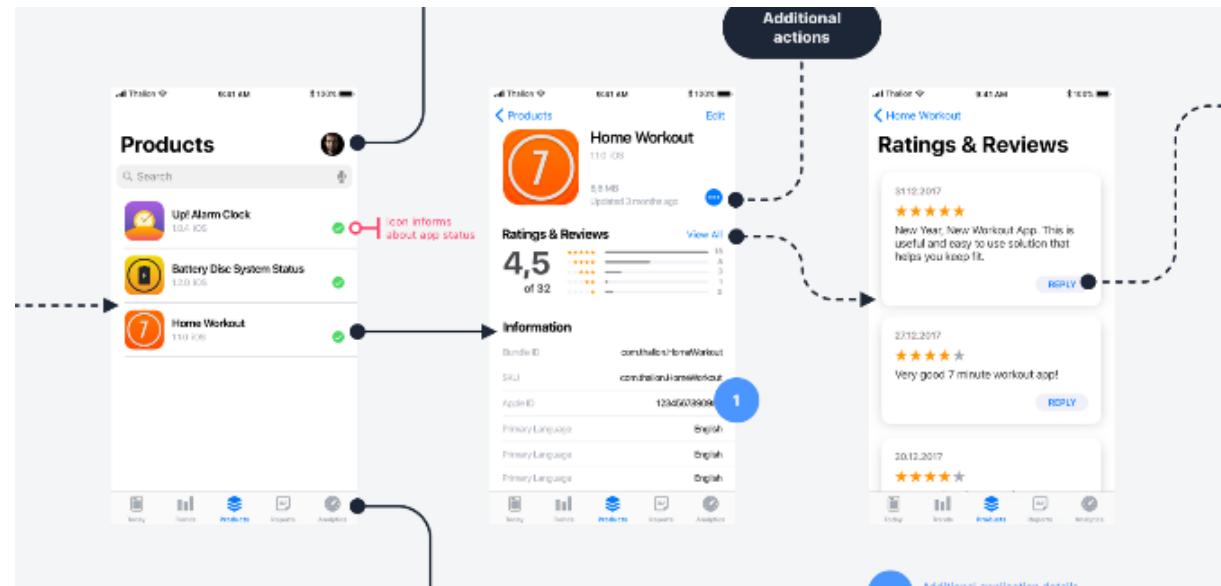
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Annotation: User Flow



Arrows should be used to indicate links between screens. You may choose to have an arrow pointing to the title of another screen if space is limited.

WALT

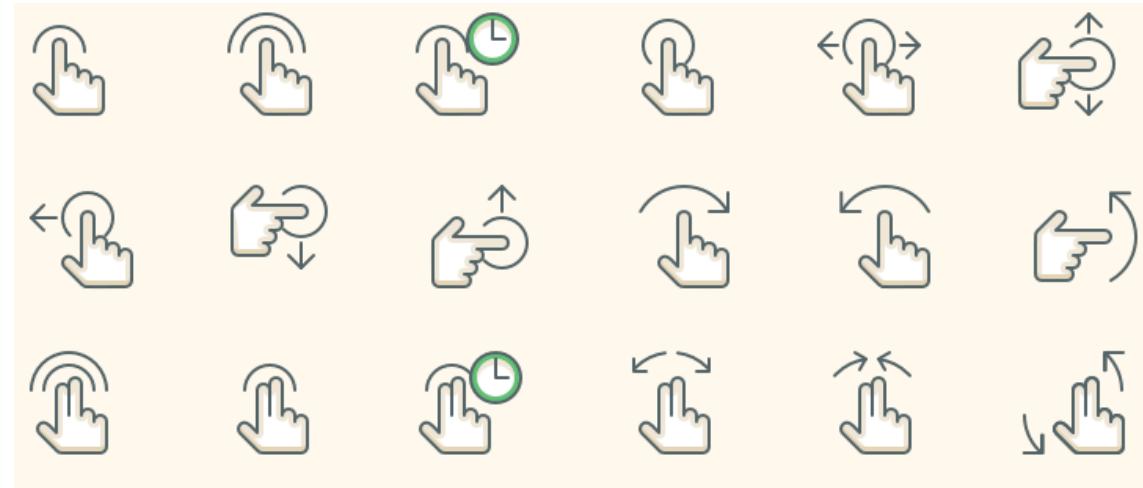
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Annotation: Gestures



Gestures - Gestures are relevant in the case of touch device design.. There are several variants of gestures used to indicate different types of actions. Gestures should be written like notes or illustrated with easy to understand symbols

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Activity 3.2

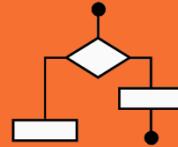
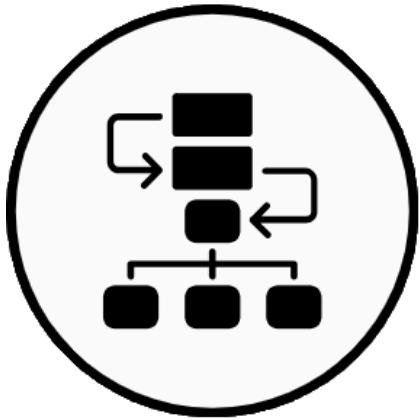
Develop two key screens for Café Loco's meal delivery app. Use the iPhone wireframe template provided. You may import the template into notability or PowerPoint.

In year 10 we hammered you hard with the 5 Key Principles of sketching:

1. Common Elements
2. Gestures
3. Titles of screens
4. Annotations
 - Elements, User Flow, Gestures
5. Notes
 - Explanation of integration of usability principles
 - Extra necessary information



3.3 Identifying key algorithms



- Key algorithms

```
Start
Read Name, Age
IF Age = .999 THEN
    Write "Error Empty File"
ELSE
    DO WHILE Name <> .999
        Write Name, Age
        Read Name, Age
    ENDDO
ENDIF
Stop
```

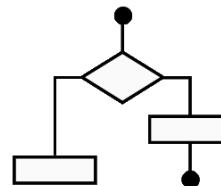
- Pseudocode

WALT

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Key algorithms

The algorithms identified in your mind map should be considered key algorithms.

There will be multiple ways to write an algorithm to perform a set task but a few questions to ask would be:

- What data needs to be collected?
[e.g. user input, sensor readings]
- How are we going to manipulate/process the data?
[e.g. calculations, sorting]
- What do we do with our data once it has been processed?
[e.g. display results, adjust settings]

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```
Start
Read Name, Age
IF Age = -999 THEN
    Write "Error Empty File"
ELSE
    DOWHILE Name <> -999
        Write Name, Age
        Read Name, Age
    ENDDO
ENDIF
Stop
```

Pseudocode

Pseudocode allows programmers to plan algorithms in an informal natural language rather than in a specific syntax. This means algorithms can be easily read by all programmers regardless of which programming languages they're familiar with.

On QLearn download a copy of the QCAA Pseudocode Guide (it's a real banger!)

Example

An algorithm that collects two numbers from a user and then calculates the total would be written as:

BEGIN

```
INPUTnum1
INPUT num2
total = num1 + num2
OUTPUT total
```

END

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        Read Name, Age
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ENDIF
Stop
```

Pseudocode - Conventions

Pseudocode must follow a few simple rules. Firstly it is important to show the structure of an algorithm through the use of CAPITALS.

Algorithm Title (Purpose)

INPUT X

OUTPUT X

IF / LOOP / REPEAT X 5

run this bit of code

END IF / END LOOP / END REPEAT

Collect value of X from user,
sensor etc.

Display or export value of X
somewhere.

If statements and loops must
have matching end if or end loops
etc. Indent code to be executed.

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        Read Name, Age
    ENDDO
ENDIF
Stop
```

Pseudocode – Example 1

A program that collects a grade from a student that tells them whether they have passed or failed. A pass is a grade of 50 or more.

Grade Checker

BEGIN

 INPUT grade

 IF grade >= 50 THEN

 OUTPUT pass

 ELSE

 OUTPUT fail

 END IF

END

(FYI the indents on the Power Point slides are intense – yours does not need to be!)

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        Read Name, Age
    ENDDO
ENDIF
Stop
```

Pseudocode – Example 2

An algorithm that counts down to 0 from a number a user has entered.

Countdown

BEGIN

 INPUT userNum

 WHILE userNum not equal 0

 OUTPUT userNum

 userNum = userNum - 1

 END WHILE

END

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```

Pseudocode – Example 3

An algorithm to calculate the area and perimeter of a rectangle. A user will enter the length and width of the rectangle. Results are to be displayed 5 times.

Rectangle Calcs

BEGIN

INPUT width

INPUT length

area = width x length

perimeter = 2 x (width + length)

REPEAT X 5

OUTPUT area

OUTPUT perimeter

END REPEAT

END

WALT

- Examine a problem to determine achievable outcomes within set deadlines.
- Determine features to include in an app
- Communicate planning for an app through a detailed mind map



Activity 3.3 A

Write an algorithm in pseudocode that keeps track of the sum of numbers entered by a user until the total is more than 100. A user will only enter one number at a time.

WILF

- Whole class will work through exploring and developing a hypothetical app.
- Students will create a detailed mind map of an app concept.
- Students will discuss the difference between an app goal and a user goal.

WALT

- Examine a problem to determine achievable outcomes within set deadlines.
- Determine features to include in an app
- Communicate planning for an app through a detailed mind map



Activity 3.3 B

Write an algorithm in pseudocode that a teacher could use to work out the average score for a class. The teacher will enter the value -1 when all grades have been entered for the class.

WILF

- Whole class will work through exploring and developing a hypothetical app.
- Students will create a detailed mind map of an app concept.
- Students will discuss the difference between an app goal and a user goal.

WALT

- Examine a problem to determine achievable outcomes within set deadlines.
- Determine features to include in an app
- Communicate planning for an app through a detailed mind map

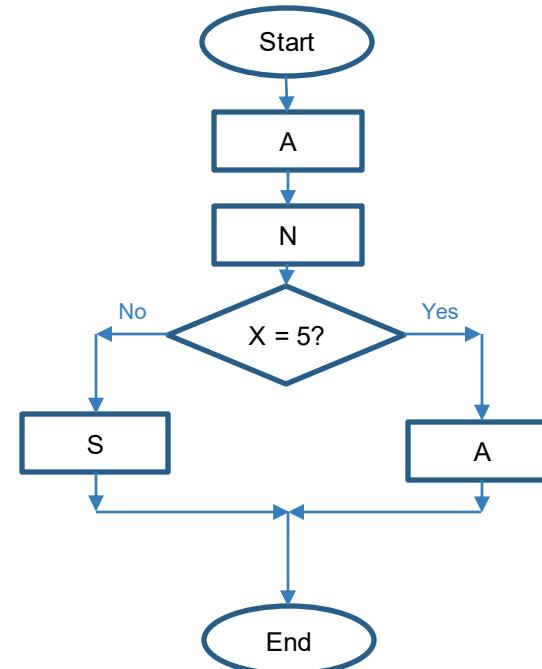
WILF

- Whole class will work through exploring and developing a hypothetical app.
- Students will create a detailed mind map of an app concept.
- Students will discuss the difference between an app goal and a user goal.



Activity 3.3 C

Convert the flow chart into pseudocode.



WALT

- Examine a problem to determine achievable outcomes within set deadlines.
- Determine features to include in an app
- Communicate planning for an app through a detailed mind map

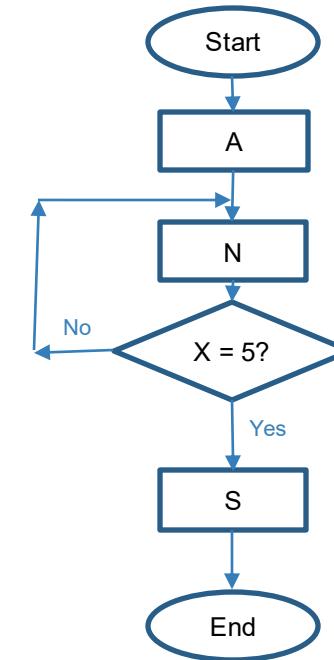
WILF

- Whole class will work through exploring and developing a hypothetical app.
- Students will create a detailed mind map of an app concept.
- Students will discuss the difference between an app goal and a user goal.



Convert the flow chart into pseudocode.

Activity 3.3 D



WALT

- Examine a problem to determine achievable outcomes within set deadlines.
- Determine features to include in an app
- Communicate planning for an app through a detailed mind map

WILF

- Whole class will work through exploring and developing a hypothetical app.
- Students will create a detailed mind map of an app concept.
- Students will discuss the difference between an app goal and a user goal.



Convert the flow chart into pseudocode.

Activity 3.3 E

