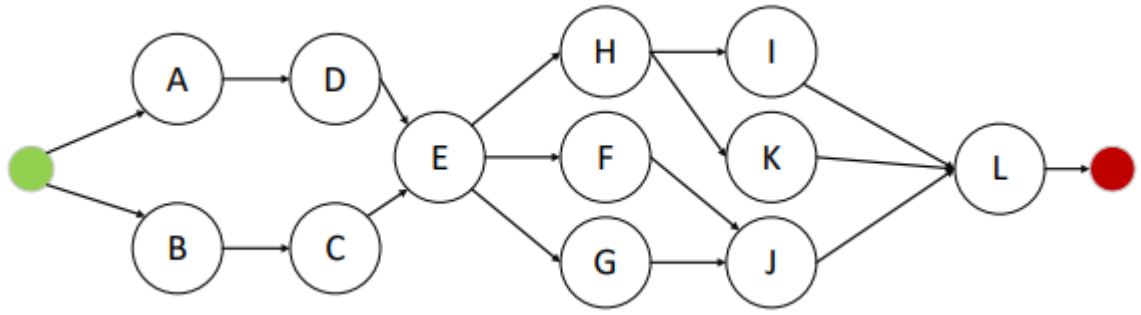
(90029678) ISEN EXERCISE 02 THEORY

Question 1: Planning, and Agile Software Project Management [Total Marks: 20]



(1a)

Table 1: AON Graph

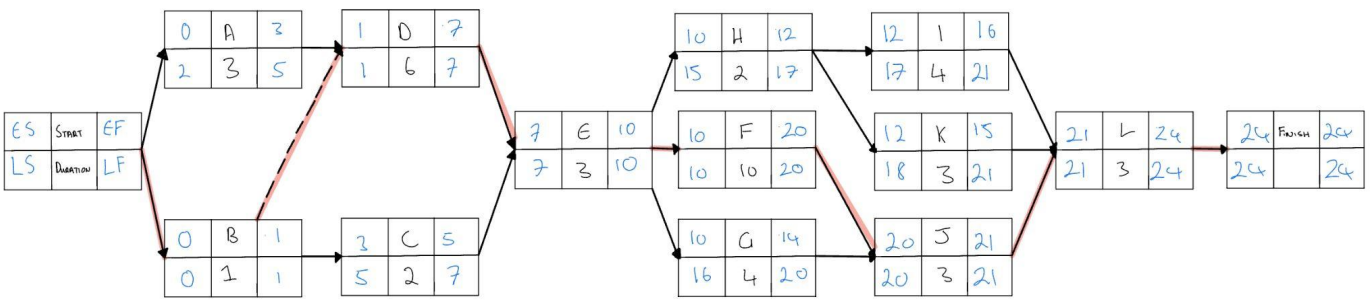
Sr.	Task	Duration (weeks)	Dependencies
1	A	3	-
2	B	1	-
3	C	2	B
4	D	6	A
5	E	3	C,D
6	F	10	E
7	G	4	E
8	H	2	E
9	I	4	H
10	J	1	F,G
11	K	3	H
12	L	3	I,J,K

(1b)

Task	Earliest Start	Earliest Finish	Latest Start	Latest Finish	(1C) Slack Time
Start	0	0	0	0	0
A	0	3	2	5	2
B	0	1	0	1	0.
C	3	5	5	7	2
D	1	7	1	7	0
E	7	10	7	10	0
F	10	20	10	20	0
G	10	14	16	20	6
H	10	12	15	17	5
I	12	16	17	21	5
J	20	21	20	21	0
K	12	15	18	21	6
L	21	24	21	24	0
Finish	24	24	24	24	0

(1d)

Critical path = Start -> B -> D -> E ->F -> J -> L -> Finish



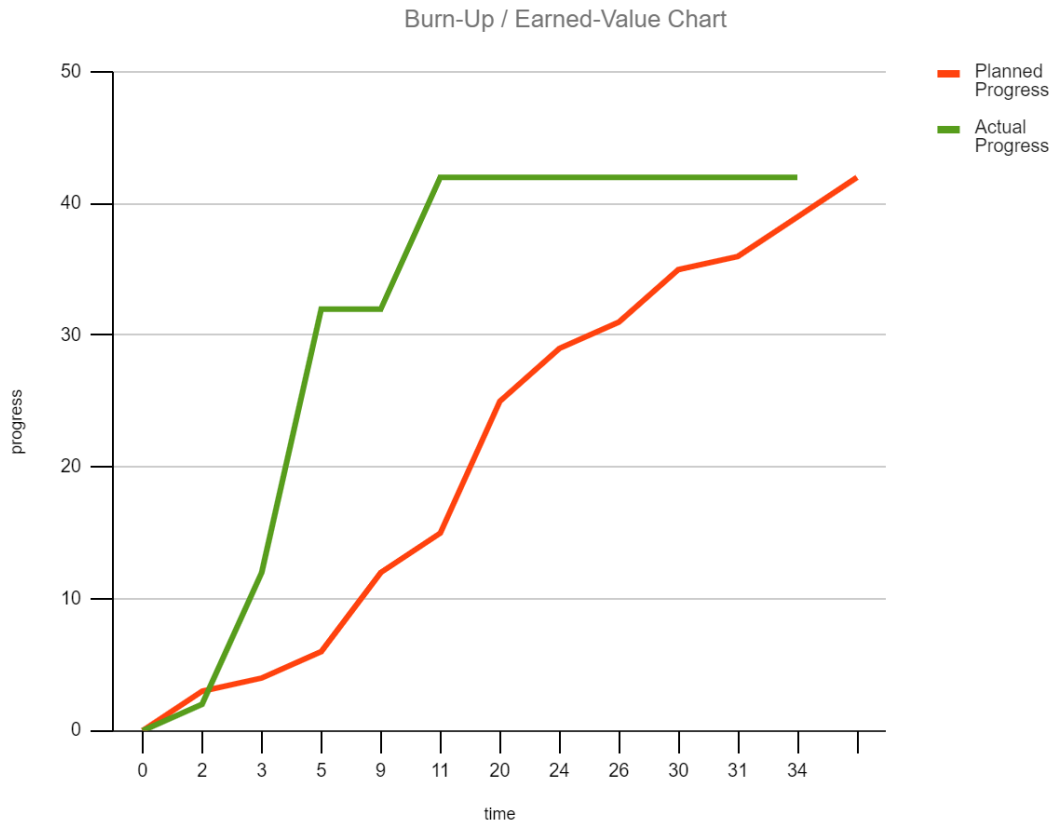
(1e)

It would be necessary to evaluate the impact adding M,N,O to the WBS will have on the overall project. This would be done in sprint meetings where the product owner will decide with the scrum master and development team on which parts of the projects will have the highest priority. The product owner will also have to collaborate with the client on which activities they want to prioritise after input from both parties decisions can be made on what to focus on, on whether to adjust the production time etc. The scrum master and the development team must also have conversations around the restructuring of the sprint backlog. If M,N and O are added, some tasks in the backlog might have to be removed or redistributed. After this, the product owner, scrum master and development team will have another sprint meeting discussing the updated changes to the backlog and make further changes if necessary. Once this is done, the product owner will communicate these changes to the client.

(1f)

You have completed activity " F" by week 20 and all dependencies of "F". However, all other activities are not complete. Estimate actual performance on the Burn-up Chart and describe the overall project progress in text. (4 marks)

Task	Estimated Duration (weeks)	Actual Finish		Time (actual week)	Planned Progress	Actual Progress
A	3	2		0	0.0	0
B	1	1		2	3.0	2
C	2	2		3	4.0	12
D	6	4		5	6.0	32
E	3	2		9	12.0	32
F	10	9		11	15.0	42
G	4	4		20	25.0	42
H	2	2		24	29.0	42
I	4	4		26	31.0	42
J	1	1		30	35.0	42
K	3	3		31	36.0	42
L	3	3		34	39.0	42
					42.0	



The actual progress has exceeded the planned progress and the project is completed Earlier than planned. Signifies that the development of the project is faster than what is planned as F is completed 4 weeks earlier than what was planned.

(1g)

2.When activity “K” and “F” are under review. (2 marks)

To do	In progress	Under Review	Done
A	J	F	E
B	L	K	H
C		G	
D			
I			

Question 2: Functional and Non-functional requirements [Total Marks: 20]

(2a)

(i) System for handling credit card application

Stakeholders

- Bank institutions so they can make their banking processes easier for them and the customer
- Business owner that run their finances through the app
- The developers who update the systems and keep it running

Actors

- administrators
- Database to store credit information****
- Bank customers who want to make payments etc.

(ii) Online bookstore that sells new and used books

Stakeholders

- Book publishers and independent Authors who will rely on the software to sell their books
- Customers as they buy books from the system
- System owners as they make sure the system runs smoothly allowing for customers to make purchases

Actors

- Book sellers (new or used) as they provide and ship the books to their customers
- Database to store customers purchase and other data
- The customer interacting with the system/purchasing their productG.Show a Kanban Board when both

(2b)

(i) System for handling credit card application

As an administrator I want to view user activity so I can see if it is suspicious.
As a business owner I want to see my purchase history so I can make smarter business decisions for my business.
As a bank customer I want to move money to my savings so I can use it in an emergency.

(ii) Online bookstore that sells new and used books

As a bookseller I want to ship my book so the customer can receive it.
As a book publisher I want to update my store page so the customer can look at my new books.
As a customer I want to purchase my book so I can read it when it arrives.

(2c)

(i) System for handling credit card application

As a bank customer I want to move money to my savings so I can use it in an emergency.

- Goal:
  To allow the user to move money they have in credit to their savings account

- *Primary actor:*
  User (human)
- *Secondary actor/s:*
  Database (non human)
- *Preconditions:*
  The user must have an account and must be logged on.
  The user must have their credit card connected to their account
  The Database must have the users account details in the system
- *Trigger:* the customer chooses the “Add to savings” selection

- *Flow of Events*:
    1. The user enters their pin details.
    2. The user inputs the amount of money they want to move
    3. The user selects the “Enter” selection.
    4. The Database processes the user’s action.
    5. The Database Updates the user’s account
    6. The customer receives a message notifying them their money has been moved successfully.
- *Extensions*:
- 1A. The customer enters expired/incorrect pin details
    - The application displays the message “Incorrect/expired details. Please re-enter again” to the user
    - The user re-enters correct pin details
    - FOE resumes from step 2.
- 2A. The customer does not have enough money to move to their savings account
    - The application displays the message “you do not have the money required to move to savings. Please re-enter amount
    - The user re enters the amount they want to move
    - FOE resumes from step 3

(ii) Online bookstore that sells new and used books

As a customer I want to purchase my book so I can read it when it arrives.

- Goal:

  To allow the customer to purchase a book and for that book to be shipped to their address
- *Primary actor:*

  Customer (human)
- *Secondary actor/s:*

  Database (non human)

  Book Publisher/seller (hunan)
- *Preconditions:*

  The Customer must have an account and must be logged on.

  The Publisher/seller must have the customer’s order details

  The database must have the customer’s order details in the system

- *Trigger:* the customer chooses the “Purchase book” selection
- *Flow of Events*:
    1. The customer enters their bank details.
    2. The customer enters their address.
    3. The customer selects the “pay now” selection.
    4. The database stores the customer’s order details.
    5. The database notifies the Publisher/seller that the customer has made an order
    6. The publisher/seller enters the “sent” selection once the book has been shipped
    7. The database processes the action
    8. The customer is displayed a message which states that the book has been shipped
- *Extensions*:
- 1A. The customer enters expired/incorrect bank details
    - The system notifies the customer that they have entered the incorrect bank details
    - The customer enters the correct bank details
    - FOE resumes from step 2

- 2A The customer enters the wrong address
    - The system notifies the customer that they have entered the incorrect address details
    - The customer enters the correct address details
    - FOE resumes from step 3
- 6A The publisher/Seller has ran out of stock
    - The publisher/seller inputs they have ran out of stock
    - The database processes the change in stock
    - The Customer gets notified stock has ran out
    - The system prompts the Customer to remove the book from their cart and purchase another book
    - If another book is chosen, FOE resumes from step 1.

(2d)

(i) System for handling credit card application

As an administrator I want to view user activity so I can see if it is suspicious.
ROCOF would be the best reliability metric for this user story. If ROCOF is used as a reliability metric, it can analyse how frequent suspicious activity is occurring in the credit card application and it allows for the administrator to deal with such suspicious activity as fast as they possibly can.

As a business owner I want to see my purchase history so I can make smarter business decisions for my business.
Availability is the best reliability metric for this user story. AVAIL is the best metric for this because for the business owner to look at their past purchases and how much money their business is bringing in, the credit card application has to be up and available with the necessary data accessible for the business owner.

As a bank customer I want to move money to my savings so I can use it in an emergency.
Availability is the best reliability metric for this user story. AVAIL is the best metric for this because the credit card application needs to be up and running for as long as possible so it can be as available as it can for the bank customer to transfer funds from their credit to their savings and use that savings money for later.

(ii) Online bookstore that sells new and used books

As a bookseller I want to ship my book so the customer can receive it.
Availability would be the best reliability metric for this user story as it can be used to assess how effective and available the system is at forwarding the shipping process so that the customer can receive their book. AVAIL as a metric will be able to track the performance of the system in terms of uptime because if the system is down, the seller will not be able to sell their books.

As a book publisher I want to update my store page so the customer can look at my new books.
Availability would be the best reliability metric for this user story. AVAIL can be used to track how long the Publisher/sellers web page is up so that the publisher/seller can update it to post their new books they are selling while also tracking how long the store page is available for the customer so that they can look at and potentially purchase books from the store page.

As a customer I want to purchase my book so I can read it when it arrives.
POFOD would be the best reliability metric to use for this user story as it can be used to evaluate how good the system is at processing the order of the customer's book and forwarding the delivery process by sending notifications to the publisher or second hand seller to ship the nook to the customer. A higher POFOD for the system in this regard means that the system is reliable at going through the purchase/delivery process.

(2e)

1. As a book publisher I want to update my store page so the customer can look at my new books.
    - The system must display book information clearly so the customer can be more informed before they make a purchase.
    - The system must allow the publisher to add filtering options so that the customer can find specific genres of books
    - The system should have a search bar so the customer can find the book they want faster.

2. As a business owner I want to see my purchase history so I can make smarter business decisions for my business.
    - The application must show all purchases the user made since they activated their card.
    - The application must clearly present if money has been taken out/ put into the account so the business owner can efficiently track their history
    - The application must have sorting options in case the business owner wants to look for certain purchases/withdrawals.

3. As a bank customer I want to move money to my savings so I can use it in an emergency.
    - The application must process money moving from credit to savings within 45 seconds on average.
    - The application must allow the user to review their transaction so they can see how much money they have moved.
    - The application must allow for the users to transfer money from their credit to their savings in 5 clicks.

Question 3: Unit testing [Total Marks: 25]

(3a)

Test Case	Input	Expected Result
Valid	Direction = N X = 0 Y = 0	(-1,0)
Valid	Direction = S X = 0 Y = 0	(1,0)
Valid	Direction = W X = 0 Y = 0	(0,1)
Valid	Direction = NE X = 0 Y = 0	(0,-1)
Valid	Direction = NW X = 0 Y = 0	(-1, -1)
Valid	Direction = SE X = 0 Y = 0	(-1, -1)
Valid	Direction = SW X = 0 Y = 0	(1, 1)
Valid	Direction = X = Y =	(-1, 1)
Invalid (wrong coordinate is entered)	Direction = X X = 0 Y = 0	ValueError
Invalid (x coord)	Direction = N X = -1 Y = 0	ValueError
Invalid (Y coord)	Direction = N X = 0 Y = -1	ValueError
Invalid (exceeds value limit xcoord)	Direction = N X = 8 Y = 0	ValueError
Invalid (exceeds value limit ycoord)	Direction = N X = 0 Y = 8	ValueError

(3b)

Test Case	input	Expected result
valid input, car1 quicker	Top_speed_one = Top_speed_two = Acceleration_one = Acceleration_two =	Car 1
valid input, car2 quicker	Top_speed_one = 200 Top_speed_two = 180 Acceleration_one = 10 Acceleration_two = 8	Car 2
Valid input, tie	Top_speed_one = 290 Top_speed_two = 310 Acceleration_one = 12 Acceleration_two = 15	Tie
Invalid input, car1 zero as top speed	Top_speed_one = 268 Top_speed_two = 268 Acceleration_one = 12 Acceleration_two = 12	Invalid Input
Invalid input, car2 negative acceleration	Top_speed_one = 0 Top_speed_two = 180 Acceleration_one = 10 Acceleration_two = 8	Invalid input
Invalid input, both cars zero top speed	Top_speed_one = 260 Top_speed_two = 220 Acceleration_one = 20 Acceleration_two = -8	Invalid input

Test Case	Input	Expected result
No while loop entered + not perfect	2\n5\n	2\n1\n
While loop entered + perfect	-1n\n5\n5\n5\n	invalid\n1\n0\nPerfect\n
No while loop entered + perfect	5\n5\n	1\n0\nperfect\n
While loop entered not perfect	-1n\n5\n2	invalid \n2\n1\n

Question 4: Modularity [Total Marks: 20]

(4a)
(i)

Sr.	issue	category	comment	solution
1	Global variable is used	Coupling issue	Using global makes the code of the calculator heavily dependent on the first 3 functions (high coupling no bueno).	Remove global variables from code
2	Repetition of code	Redundancy issue	The code to to calc results and to calc again repeated multiple times. Makes code confusing to follow	Place repeated code into separate functions.
3	2 operations per function	Cohesion issue	Add/subtract and multiply/divide are put into their own functions. 2 tasks are being done in one function	Create separate functions for +,-,*,/ to maximise cohesion and decrease coupling.

(ii)
Flags are used in the code as conditional statements that use bools to determine what operation can be performed with the number values inputted by the user for example in def add_or_subtract and in def times_or_divide. This can be problematic as it causes the responsibility of the functions that are flagged to be mixed between executing and performing the operation.

Question 5: Ethics and Professionalism [Total Marks: 15]

(5a) Travel agency booking system
A development team has been hired to develop a travel agency booking system. This system allows for a customer to view flights from multiple airlines and purchase tickets for flights to different destinations. The application also notifies the customer when airline tickets go on sale or if there has been a drop in ticket prices. A client has paid the development team a handsome amount of money to create this application and a contract has been signed to release the application in a given timeframe. However, within the development team there has been a lack of professionalism when planning out the project with the development team severely under estimating the length of the project and the time it takes to create and test the features they plan to implement.

As the release date for the application gets closer, the developers increasingly get overwhelmed with the project as their estimates have caused them to miss milestones and crunch more to get the task done. Some developers experience health issues due to the stress caused by the crunching. As the release date edges closer, the development team decides to forgo some features that they deem unnecessary. After showing the client the final product, the client refuses to pay as they are not satisfied with the final product.

(5b) IT remote assistance software

A development team has been hired to develop an IT remote assistance software system. This system allows for individuals to provide technical support from a distance and give individuals access to computer screens so they can fix technical issues, scan for bugs etc . The software asks for a user's permission to access their system before the software can access it.

There has been a lack of professionalism when testing the systems non functional requirements. The development team has not analysed the system and assessed how the system performs in a thorough manner. This causes the development team to lie about the performance of the systems and how secure the system is.

When the system releases, users find the system to be buggy and not up to the standard that the development team states it should. The software takes an extremely long time to connect to other computers and perform its tasks. This results in a poor user experience and users going on to use another it remote assistant that performs better.

(5c) A smart TV operating system

A development team has been hired to create a smart TV operating system. The software allows the users to change features of the TV such as the screen mode (Game, Sport, Cinema), aspect ratio etc. The software also offers the user an array of applications such as streaming services and video sharing applications from their smart TV.

The development team is Using Scrum to manage the project, releasing the ground software and updating software after a two week sprint is finished. In the first few sprints, the development team decides to work on the necessary features that they believe are essential such as changing the aspect ratio, changing the screen mode. When surveying users to ask what features they want, they want features such as an appstore on the software so they can download more applications onto their smart TV, the development team does not see this feature as important however and keep it in their backlog to work on in a later sprint

As months pass and the feature of an app store has not been worked on, customers become annoyed with the development team and begin to use different smart TV operating systems. The lack of customers paying for the software causes the development team to not receive the funding they need to continue working on the project causing the development of the project to stagnate.