ASTON UNIVERSITY

JANUARY 2022

Online Assessment Answer Booklet

Question Number 1a:

JUSTIFY if these objectives are SMART or not, by referring to the various aspects of the SMART definition:

(i) The product should have an easy-to-use UI by the end of the year.

This objective is not specific as it is too vague in regard to the UI. We don't know what "easy to use" means therefore the objective is NOT a SMART.

(ii) This tax management software should include an embedded MKV video player by the end of November.

This objective is specific as we know it is software that manages tax. We know it is measurable as we know we have succeeded if we have embedded MKV video player into the software. Why would a tax management software need to embed a video player, therefore it is not relevant? It is time constrained which contributes to making the objective measurable therefore it is NOT a SMART objective.

(iii) This final year project should support hundreds of thousands of simultaneous players by the end of the year.

This objective is not specific as we know that the projects' main goal is to support thousands of players simultaneously. This objective can be measures though the quality of players that are supported by the project and also through the time constrained deadline. It is not achievable for a final year project. It is NOT a SMART objective.

(iv) The new website should load in less than 1 second for 90% of requests in a latest-generation Mac with Chrome, by the end of the month.

This objective is specific as the goal is to load the website within a specific time constrained boundary. It is measurable as the objective describes the outcome which can be recorded. In this scenario, it is loading the website in less than 1 second for 90% of the requests. The objective can be measured through time constrained limit which is the end of the month. It is a SMART objective.

(v) The game will include 10 levels.

The objective is specific as the goal is that the game contains 10 levels. It is measurable as we can measure whether the goal is reached if 10 levels are completed. It is not time constrained therefore it might not be achievable as people might lose motivation. The objective does not seem realistic as there is no deadline for this project to be completed. It is NOT a SMART objective.

Question Number 1b:

PROVIDE THREE DIFFERENCES between the concepts of an objective and a goal and PROVIDE EXAMPLES of each from your final year project.

Difference 1:

	Objective	**Goal**
Differences	Concentrates more on short term.	Concentrates more on the end result so long term.
Example	Complete 3 literature reviews regarding nudging each week.	Get a first in my final year project.

Difference 2:

	Objective	**Goal**
Difference	Easy to measure.	Difficult to measure.
Example	I need 10 people for an interview regarding cyber security related questions.	Reduce the rate of passive disclosure of personal information.

Difference 3:

	Objective	**Goal**
Difference	Objectives are more specific.	Goals are general statements of what is to be achieved.
Example	Complete first draft of ethics form by end of January.	Experiment conducted should give insight on whether nudges are effective.

Question Number 1c:

IDENTIFY TWO risks in your final year project. ANALYSE them and PROPOSE a strategy to manage them. JUSTIFY your analysis and your choice of strategy.

	Risk 1:	**Risk 2:**
Identification:	Performance Risk. This is simply the risk that the project won't produce the results outlined in the project specifications.	Schedule Risk. This is the risk that project tasks will take longer to complete than estimated.
Analyse:	Actors relate to those involved in the project. If actors do not turn up for interviews, it will lead to loss of information that will affect the research of the project.	The first phase of my experiment is a questionnaire. If no-one completes it, they cannot participate in phase 2. The experiment is delayed.
Proposal:	To manage this risk, I have planned to interview double the amount of people I need. It is more beneficial to interview more people than have less data.	To manage this risk, submit a longer time frame to run my experiment in ethics form. This will provide a chance to not rush the questionnaire and get detailed and quality responses. Reminders will be sent out through emails, so it has more engagement.

Question Number 1d:

COMPARE direct measurement and indirect measurement. Suppose we define "defect density" as the number of defects divided by the size of the software. IDENTIFY if it would be a direct or indirect measurement and EXPLAIN if it would be a valid measurement.

Direct measurement is an attribute of an entity measured without the need to measure other attributes or entities. An example of direct measurement is length of source code. Indirect measurement is calculated from measuring something else. An example of indirect measurement is software defect density as it is calculated from number of defects divided by software size.

For a measurement to be valid or invalid, the measurement needs to be accurate, meaningful, and reliable. This is valid measurement as the number of defects in a software application may help decide if the application is ready to be released.

Question Number 1e:

STATE the types of backlogs used in Scrum and EXPLAIN when items are added or moved between them.

The main scrum backlog consists of product backlog, sprint backlog and release backlog. Product backlog needs continuous refinement as new items are added and priorities change. Features are priorities for implementation, so they are moved into the release backlog. Features are broken down in user stories in the release backlog so it can be completed in sprints. User stories then are moved into a sprint backlog.

Question Number 2a:

A Canadian construction company would like to develop an employee portal with an HR focus to facilitate access to HR documents and increase engagement and satisfaction of the company's employees. A project manager has been appointed to manage this project. The HR portal is supported by a database which contains employee profiles (name, surname, age, position, skills, education, hire date, personal information, etc...).

When defining the project plan, in terms of risk management, the project manager identified two negative risks:

- R1: "The database used in the system cannot process as many transactions per second as expected"
- R2: "Key Staff are ill at critical times in the project"

(i) IDENTIFY the risk category, justifying your answer.

The risk category is actor for R2. Actors relate to those in the project, such as the manager. If staff becomes ill at critical times in the project, it can cause delays to the project overall.

The risk category is technology for R1. This refers to tools for development and techniques used to implement the project. If technologies chosen are not appropriate, then the project cannot deliver the requirements of the project efficiently.

(ii) ESTIMATE the severity of the risk.

R1 is high impact and low probability. R2 is moderate probability and low impact.

(iii) PROPOSE a mitigation strategy, justifying your answer.

In R1, you can update or change the database which can meet the project deliverable. This can improve the number of transactions per second made.

In R2, could have an option where staff could work from home (remote) if they don't feel able to travel. Another option could be hiring external temporary workers. We could move healthy key workers to the critical stages and the temporary works can take the non-critical work. This could increase numbers of staff at critical stage of the project alongside make sure non-critical times are covered.
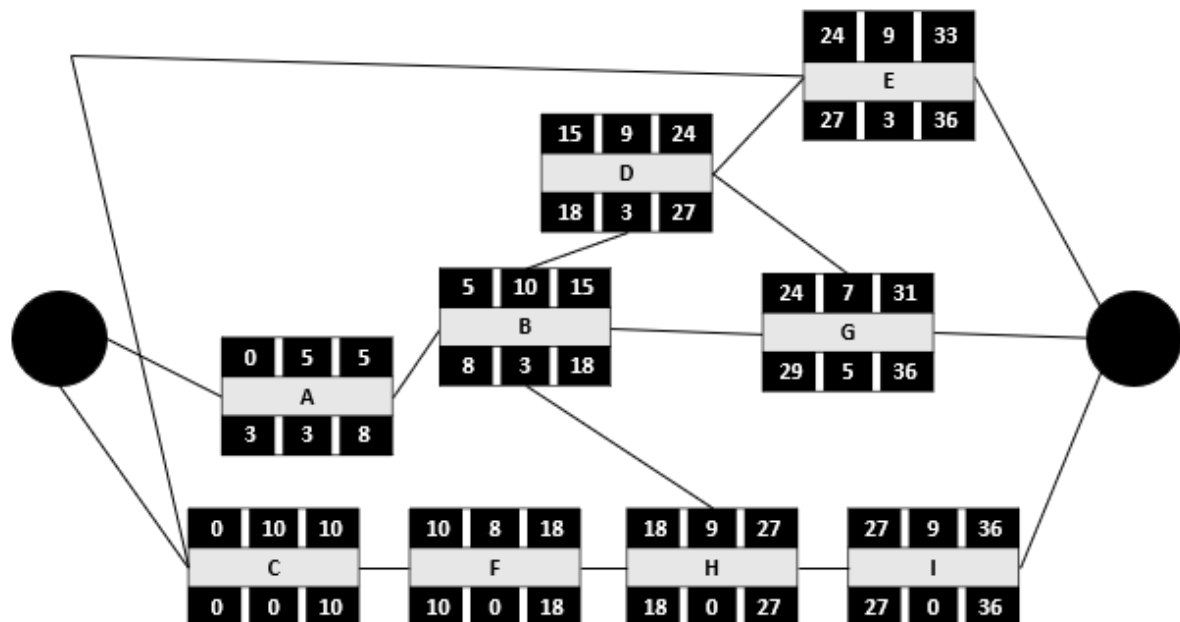
Question Number 2b:

The details of all activities in a software project are listed below:

Activity	Depends on	Duration (weeks)
A		5
B	A	10
C		10
D	A, B	9
E	C, D	9
F	C	8
G	B, D	7
H	B, F	9
I	H	9

(i) DRAW an activity network for this project AND use it to carry out a critical path analysis for this project. For EACH project activity, this analysis must identify:

- The earliest and latest start,
- The earliest and latest finish,
- The float.

Question Number 2b:

(ii) IDENTIFY the critical path and the earliest finish time for the project.

Critical Path = C -> F -> H -> I.

Earliest Finish Time = 19 weeks.

(iii) EXPLAIN if it is possible for a project not to have a critical path, and if it is possible for a project to have more than one critical path. PROVIDE examples.

No critical path is not possible but there are multiple critical paths. There is always at least one path that will define the duration of the project. If we increase E to 12 then we have 2 critical paths. The second path would be start -> C -> E - > end.

(iii) DISCUSS how the information provided by the critical path analysis of a software project can be used by the project manager.

The critical path is when the path of the network has 0 floats. The whole project is delayed if the critical path is delayed. The manager can use the diagram to allocate the critical path and decide what jobs to assign which people. This increases the likelihood of project completed without delays. The activities can be shortened on the critical path if project duration has to be reduced. The manager can also review the progress of the project closely.

Question 4a:

For your final year project, JUSTIFY if you would use Scrum or Kanban, and how you would adapt the methodology to the final year project.

For my final year project, I would use the Kanban methodology. My project is a research project (not software) which discusses whether nudging will help reduce disclosure of personal information online.

The reasoning behind why I would use Kanban over Scrum is due to the work cycle. Scrum has sprints whereas Kanban is a continuous flow. This is more helpful as I'm constantly reading different research and collecting data that will either disprove or support my current theory. My experiment will only run once, so I will not need complex interactions. Another reason why I would pick Kanban is because Scrum is more disciplined when it comes to planning. My project direction changes constantly depending on the research reviewed so I will need less strict planning when it comes to my project.

I would adapt my project to the Kanban methodology by creating a board with three columns: "things to do", "currently in progress", and "completed". I would write down all the task involved in my research project such as complete 4 literature reviews per week or write up phase 1 of experiment. I would then place them in the appropriate columns.

This will help me visualise the work which is important in Kanban. Work that needs to be done will run more smoothly. To help remove interruptions, it can show me which tasks need to be broken down further which will increase my research data. My project is continuous delivery in terms or research that I conduct and review so every week I hold a meeting with my supervisor to discuss potential new paths to look into. The most important thing that the Kanban approach allows is that changes can be made at any point in time.

Question 4b:

PROVIDE AN EXAMPLE of how the Scrum backlogs would look like in your final year project.

The main scrum backlog consists of product backlog, sprint backlog and release backlog. Product backlog needs continuous refinement as new items are added and priorities change. For example, every research paper I review, my direction of the project will change. The priorities (research direction) are moved into the release backlog. The objectives are redefined and broken down so it can be completed in sprints. The user stories in terms of my project can be theories of the project so far. What implementations will help reduce disclosure of information and can be backed up by credible multiple reports. The user stories are then moved into a sprint backlog.

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Question 4c:

COMPARE the concepts of epic, user story, and task in Scrum. PROVIDE AN EXAMPLE of each one of those in your final year project.

An epic is a user story that is too hard to complete in a single sprint. It is normally broken down in many smaller stories that are easier to complete in a sprint. An example of this could be, conducting an experiment to see what personal data is more likely to be disclosed: active or passive. This can be broken down into separate stages where we have phase 1: a questionnaire. This can analyse the passive disclosure. Phase 2 is an interview where we analyse active disclosure. The final stage can be another interview where we try to implement different nudges in an attempt to reduce the disclosure of information.

A user story is short and simple descriptions of who the end user is and what they want and why. The end user in my project would be a person researching how to reduce disclosure of personal data and using my research and experiment to further the research. They can develop on my experiment, or they can repeat it to confirm / disprove the findings. My research keeps the focus on the research that will help the user stay focused on the goal of the experiment.

User stories have multiple associated tasks. A task is broken down into small units of work. An example of a task would be to run a questionnaire.

Question 4d:

DEFINE what cost monitoring is and EXPLAIN why project managers need to monitor the cost.

Cost monitoring is the need for monitoring both achievements and costs. A project manager needs to monitor costs as the project could be delayed because the number of staff is below what is required and are underbudget. Alternatively, a project could be on time as more resources have been added. This results in an over budget.

Question 4e:

Activity	Depends on	Optimistic	Likely	Pessimistic
Specification	N/A	6	8	11
Design	Specification	5	9	12
Coding	Design	4	8	10
Testing	Coding	10	15	18

APPLY the Program Evaluation and Review Technique (PERT), following these steps:

(i) **CALCULATE the expected duration and standard deviation for EACH activity in the previous table. SHOW your working clearly.**

$t_e = (L + 4M + U) / 6$ and $s = (U - L) / 6$

Activity	Expected Time (t_e)	Standard Deviation (s)
Specification	(6 + (4*8) + 11) / 6 = 49 / 6	(11 - 6) / 6 = 5 / 6
Design	(5 + (4*9) + 12) / 6 = 53 / 6	(12 - 5) / 6 = 7 / 6
Coding	(4 + (4*8) + 10) / 6 = 23 / 3	(10 - 4) / 6 = 1
Testing	(10 + (4*15) + 18) / 6 = 44 / 3	(18 - 10) / 6 = 4 / 3

(ii) **CALCULATE the expected duration and standard deviation for the entire set of activities.**

Expected duration = t_e(spec) + t_e(design) + t_e(coding) + t_e(testing) = 118 / 3 = 39.33 days.

Standard deviation = $\sqrt{s(spec)^2 + s(design)^2 + s(coding)^2 + s(testing)^2}$ = 2.19848.

(iii) **FIND an approximate value for the probability of not completing the development of the module in 38 days. You will need to use the information from the graph below.**

The z value for the proposed deadline T = 38 days is calculated using the formula.

z = (T − t_e) / s = (38 − 39.33) / 2.19848 = -0.60648.

Probability of not meeting target is roughly 75%.