

National University of Computer and Emerging Sciences

CLO #1: Learn the basics of software process models and choose the best fit for variable nature of projects in industry

[10 Marks]

Question#01: Part a

A group of engineers adopted the Scrum framework for their project workflow. At the onset of every sprint, they opt for a set of user stories to develop.

- In sprint one: The team committed to completing five user stories. Each user story had seven story points for a total of 35 story points. The team completed three of the five user stories.
- In sprint two: The team committed to seven user stories (including the two that were not completed in sprint 1). Each user story had eight story points for a total of 56 story points. The team completed four of the seven user stories.
- In sprint three: The team committed to nine user stories. Each user story had eight story points for a total of 72 story points. The team completed five of the nine user stories.

To do: Please calculate the average sprint velocity. Also calculate the number of sprints that team will need to complete the project (For remaining use stories, assume that each user story has five story points).

In sprint 1 \Rightarrow The story points got = $3 \times 7 = 21$

In sprint 2 \Rightarrow The story points got = $4 \times 8 = 32$

In sprint 3 \Rightarrow The story points got = $5 \times 8 = 40$

Average sprint velocity = $\frac{21+32+40}{3} = 31$

Number of sprints = $7 \times 5 = 35 = \frac{35}{31} = 1.12 \approx 2$

Hence, velocity and number of sprints are founded.

Question#01: Part b

[25 Marks]

Choose one of the given options for every question and fill in the right option in the answer key. Cutting and erasing on this sheet is not allowed.

Example for correct answers:

MCQ No.	Options			
1.	A	B	C	D

Answer Key				
MCQ No.	Options			
1.	A	B		D
2.	A		C	D
3.	A	B	C	
4.	A	B		D
5.	A	B	C	
6.		B	C	D
7.	A	B		D
8.	A		C	D
9.	A	B		D
10.	A	B	C	
11.		B	C	D
12.		B	C	D
13.	A	B	C	
14.	A	B	C	
15.		B	C	D
16.	A	B	C	
17.		B	C	D
18.	A		C	D
19.	A	B		D
20.	A	B	C	
21.		B	C	D
22.	A		C	D
23.	A		C	D
24.	A		C	D
25.	A		C	D

21

Please DO NOT Attempt MCQs by Ticking them here, only fill in the answer key.

1. What is a software?
 - a. Computer program and maintenance
 - b. Computer program and testing Functionality
 - c. Computer program and associated documentation
 - d. None
2. Attribute of good software is:
 - a. Development
 - b. Maintainability & functionality
 - c. Functionality
 - d. Maintainability
3. _____ suits the Manifesto for Agile Software Development.
 - a. Customer collaboration
 - b. Individuals and interactions
 - c. Working software
 - d. All of the mentioned
4. _____ is a software development life cycle model that includes risk assessment.
 - a. Incremental model
 - b. Prototyping model
 - c. Spiral model
 - d. Waterfall model
5. Which model is better for safety critical systems:
 - a. Waterfall
 - b. Scrum
 - c. Extreme Programming
 - d. None
6. Waterfall model is an example of:
 - a. Plan driven process
 - b. Agile process
 - c. Scrum
 - d. Prototyping
7. Role of Scrum master is to:
 - a. Manage product backlog
 - b. Manage Agile process
 - c. Manage sprint backlog
 - d. Prototyping
8. Role of Product Owner is to:
 - a. Own the product
 - b. Manage product backlog
 - c. Manage Agile process
 - d. Manage sprint backlog

9. Which of following is not included in prototype:
 - a. Error Checking
 - b. Recovery
 - c. Both a & b
 - d. None
10. Which of the following defines Pair programming?
 - a. Programmers working in pair
 - b. Check each other's work
 - c. Collective ownership
 - d. All of the above
11. What is the major drawback of the Spiral Model?
 - a. Higher amount of risk analysis
 - b. Doesn't work well for smaller projects
 - c. Additional functionalities are added later on
 - d. Strong approval and documentation control
12. Incremental development in Extreme Programming (XP) is supported through a system release once every month.
 - a. True
 - b. False
13. In spiral model, the spiral is divided into ____ sectors:
 - a. 1
 - b. 2
 - c. 3
 - d. 4
14. Subset of user stories from the product backlog that are planned to be delivered as the part of a sprint:
 - a. Product Backlog
 - b. Use Requirements
 - c. Sprint Requirements
 - d. Sprint Backlog
15. In extreme programming, the increments are delivered to customer are every:
 - a. 2 weeks
 - b. 3 weeks
 - c. 4 weeks
 - d. 5 weeks
16. Which of following is not an advantage of waterfall:
 - a. This model is simple and easy to understand and use
 - b. It is easy to manage due to the rigidity of the model
 - c. Waterfall model works well for projects where requirements are clearly defined and very well understood.
 - d. None of the above

National University of Computer and Emerging Sciences

17. Scrum is a scalable framework. The following statement is:
- True
 - False
18. In rapid application development (RAD), a development team produces a fully functional software in ____ days:
- 30-60 days
 - 60-90 days
 - 90-120 days
 - 120-150 days
19. ____ is not a generic activity of a software process:
- Specification
 - Development
 - Simulation
 - None of the above
20. Which of the following is not a scrum role?
- Product Owner
 - Developer
 - Scrum Master
 - ☒ Scrum Manager
21. Which of following is not a part of sprint:
- Specification
 - Development
 - Testing
 - None
22. How do the developers maintain the simplicity of code in XP?
- Test First Development
 - Refactoring
 - Both a & b
 - Pair Programming
23. Which of the following is an example of code refactoring?
- Tests
 - Renaming attributes
 - Both a & b
 - None
24. What is a potentially shippable product?
- Sprint
 - Finished product
 - Both a & b
 - None
25. Which of the following process requires availability of customer at all times?
- Waterfall
 - Extreme Programming (XP)

CLO #5: Learn basic project management skills along with costing and estimation

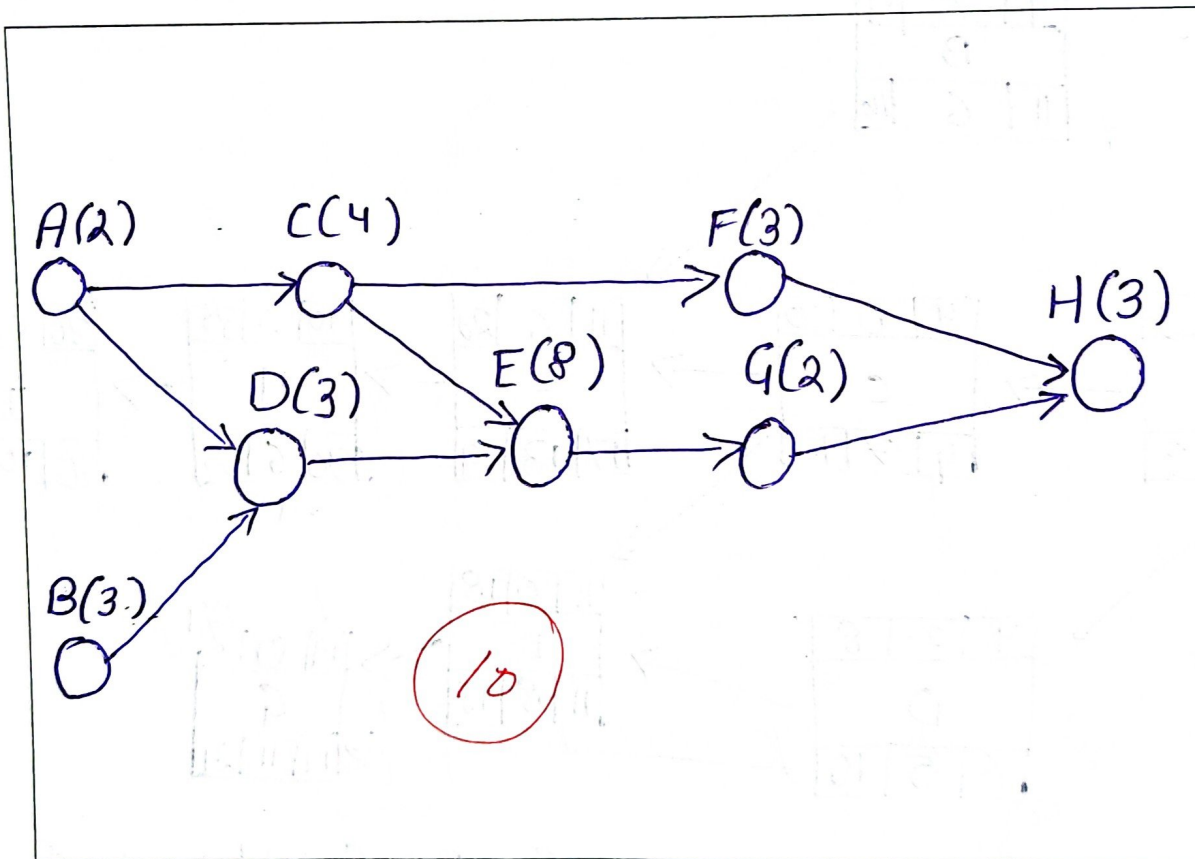
Question2: Part a

[10 Marks]

The table below defines the activities within a small project.

Activity	Completion time (weeks)	Immediate predecessor activities
A	2	-
B	3	-
C	4	A
D	3	B,A
E	8	D,C
F	3	C
G	2	E
H	3	F,G

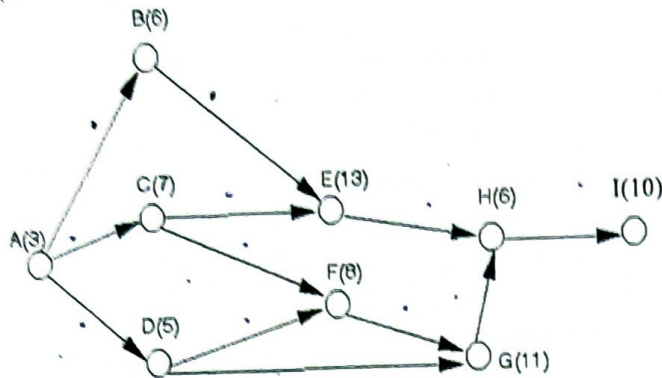
To do: Draw the activity on node graph.



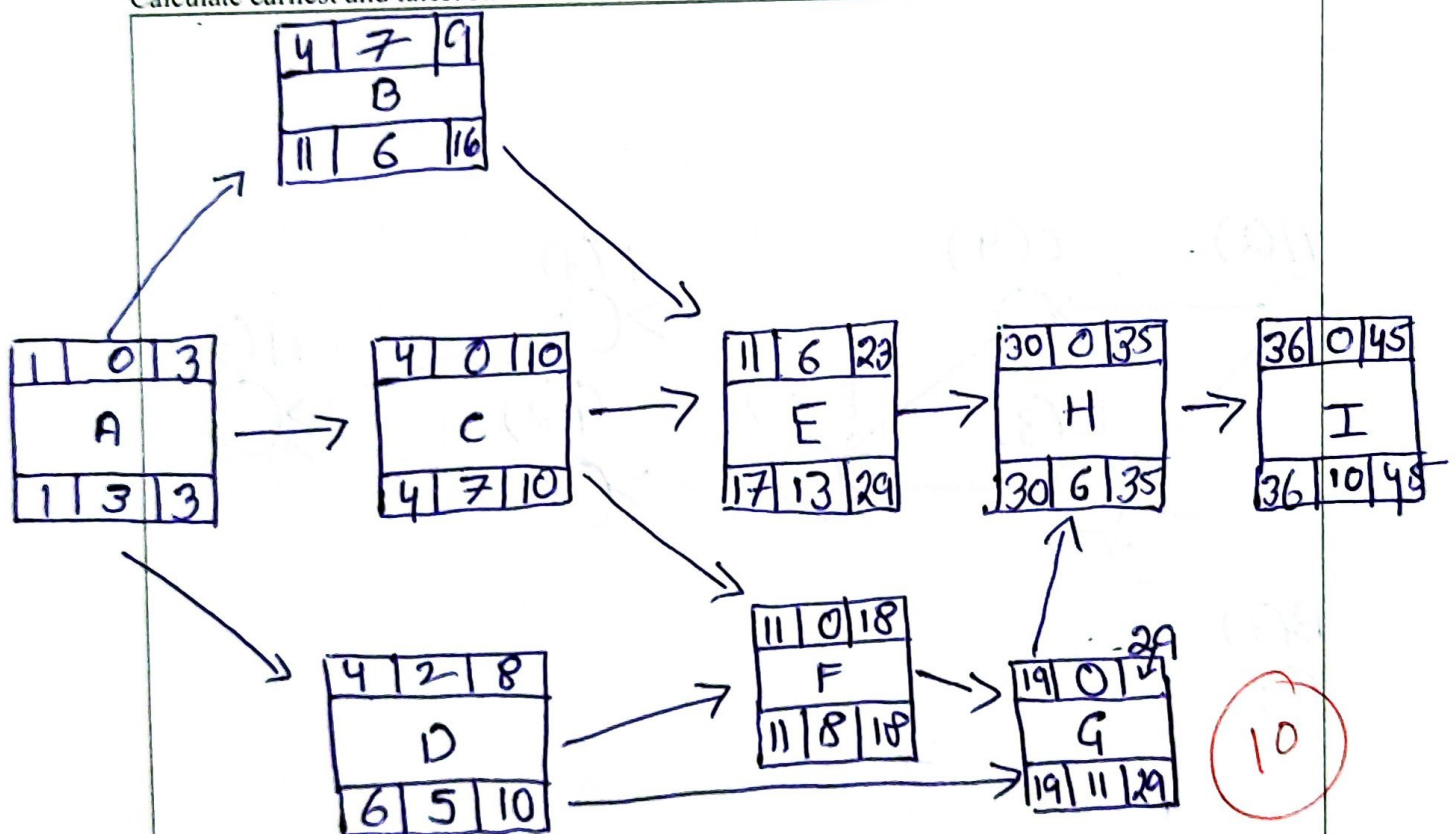
[10 Marks]

Question#02 Part b

Consider the following activity on node graph where duration of activity is mentioned in days (brackets).



To Do: Calculate the minimum overall project completion time and identify which path and activities are critical. What is the slack time associated with each of the non-critical activities? Calculate earliest and latest start time and finish time as well.



critical path $\Rightarrow A \rightarrow C \rightarrow F \rightarrow G \rightarrow H \rightarrow I$