

**Software Project Management
Fall 2016
Final Examination**

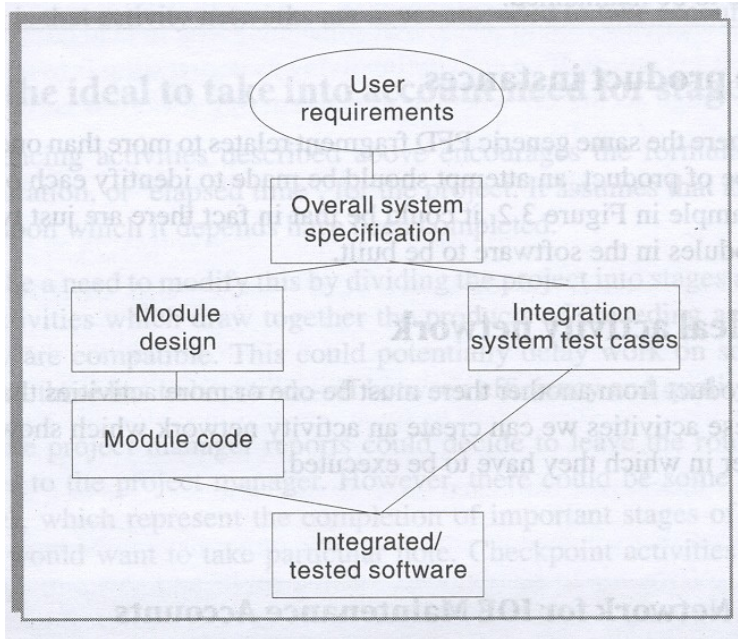
Time: 3 hours.

Total marks: 50

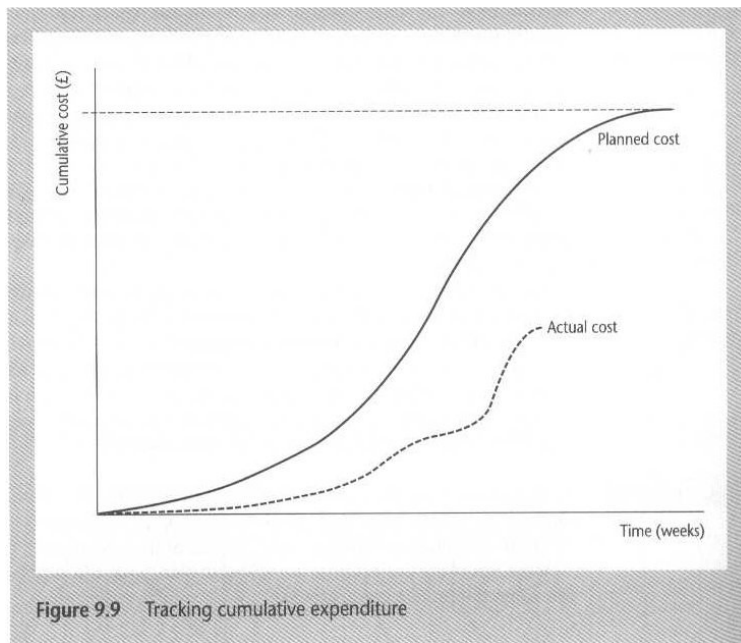
Answer the following questions.

1. The project that you are managing has slipped from its target date. What should you do?
List five different options. **(5 marks)**
 - a. **Shorten the Critical Path**
 - i. **“Work Harder” – Overtime and Weekends**
 - ii. **Adding Resources**
 - iii. **Assigning More Efficient Resources to Critical Tasks**
 - iv. **Reduce Scope**
 - v. **Reduce Quality**
 - b. **Reconsider the Precedence Requirements**
 - i. **Start Activities Before Precedent Completion**
 - ii. **Subdivide Activities**
 - iii. **Compromise on Quality**
 - c. **Maintaining the Business Case**
 - d. **Exception Planning**
2. List down five techniques for resource leveling/smoothing. **(5 marks)**
 - a. **Techniques**
 - i. **Slack**
 - ii. **Shifting the Project Finish Date**
 - iii. **Revising the Scope**
 - iv. **Smoothing**
 - v. **Further Decomposition of Activities**
 - vi. **Stretching Activities**
 - vii. **Assigning Substitute Resources**

3. What is a product flow diagram? Why do we create it? Explain with an example. (4 marks)



Part of Step 4 of Step-wise. Chapter 3 Bob Hughes book, 5th Edition.



4.

What does this graph tell us about the project's health? How can this graph be improved? **(4 marks)**

It could refer to a late project or one that is on time but has shown substantial cost savings. (under budget) We need to take account of the current status of the project before attempting to interpret it.

Add projected future costs

5. List down ANY FOUR process discriminants and explain each in one line. **(4 marks)**

- a. **Scale**
- b. **Stakeholder Cohesion or Contention**
- c. **Process Flexibility or Rigor**
- d. **Process Maturity**
- e. **Architectural Risk**
- f. **Domain Experience**

6. Write down ANY FOUR of Caper's Jones rules of thumb. **(4 marks)**

- a. **Rule 1: One FP = 125 SLOC for C programs**
- b. **Rule 2: Development Time in Calendar Months = $FP^{0.4}$**
- c. **Rule 3: Requirements Creep = 2% per month from design through coding phases**

- d. **Rule 4: Defect Removal Efficiency = 30% for each software review, inspection or test step (a series of about ten consecutive defect removal operations must be utilized to achieve good product reliability)**
 - e. **Rule 5: Manpower Estimate = $FP / 150$**
 - f. **Rule 6: Effort Estimate = $FP^{0.4} \times FP / 150$**
 - g. **Rule 7: Personnel Required for Regular Maintenance = $FP / 500$**
7. Write down two methods of reporting project status and explain each of them briefly. (4 marks)
- a. **Partial Completion Reporting**
 - i. **Measuring by Completed Products**
 - ii. **Measuring by Intermediate Products**
 - iii. **Adapting Time Sheets**
 - iv. **Re-estimated Completion Times**
 - v. **Hours Spent and Estimate of Remaining**
 - b. **Red/Amber/Green (RAG) Reporting**
 - i. **Likelihood of Meeting Target Date**
 - ii. **Traffic-Light Method**
8. Write down the formula for calculating effort using COCOMO II. Explain the variables and the units of the values used. (3 marks)
- a. **Models for three different stages**
 - i. **Application composition (recommends use of Object Points)**
 - ii. **Early design (recommends use of Function Points)**
 - iii. **Post architecture**
 - b. **$pm = A \times size^{sf} \times em_1 \times em_2 \times em_n$**
 - c. **Where pm is effort in person-months, size is in kdsi, A is a constant based on industry data (2.94)**
 - d. **Effort Multipliers em is a list of factors which are rated very low, low, nominal, high, or very high and each factor and rating has a value associated with it**
 - e. **Scale Factor $sf = 0.91 + 0.01 \times \Sigma(\text{exponent driver ratings})$**
 - f. **Exponent Drivers**
 - i. **Precedentedness**
 - ii. **Development Flexibility**
 - iii. **Architecture/Risk Resolution**
 - iv. **Team Cohesion**
 - v. **Process Maturity**
9. A project has the following estimated parameters:
- Number of resources = 10 persons
- Working Average = 5 hours/day

Cost = 5 dollars/person-hour

After ten weeks (50 working days), a total of \$10,000 worth of actual effort has been spent, while there is a slippage of 10 days in the schedule. Calculate BCWS, BCWP, ACWP, CV, SV, CPI, and SPI. (7 marks)

$$\text{PV} = \text{BCWS} = \text{cost} * \text{working average} * \text{No. of resources} * \text{planned duration} = 5 * 5 * 10 * 50 = 12500$$

$$\text{EV} = \text{BCWP} = \text{cost} * \text{working average} * \text{No. of resources} * \text{performed duration} = 5 * 5 * 10 * 40 = 10000$$

$$\text{AC} = \text{ACWP} = 10000 \text{ (given)}$$

$$\text{SV} = \text{BCWP} - \text{BCWS} = 10000 - 12500 = -2500$$

$$\text{CV} = \text{BCWP} - \text{ACWP} = 10000 - 10000 = 0$$

$$\text{SPI} = \text{BCWP} / \text{BCWS} = 10000 / 12500 = 0.8$$

$$\text{CPI} = \text{BCWP} / \text{ACWP} = 10000 / 10000 = 1$$

$$\text{CV} = \text{EV} - \text{AC}$$

$$\text{SV} = \text{EV} - \text{PV}$$

$$\text{SPI} = \text{EV} / \text{PV}$$

$$\text{CPI} = \text{EV} / \text{AC}$$

10. Refer to the activity estimates and precedents below. Create a precedence network, perform forward pass and backward pass, calculate the span and float and identify the critical path(s). Use Day 0 as the starting point and the day number used should indicate the end of each day. Calculate the numbers accordingly. (10 marks)

Activity ID	Activity Description	Estimated Duration (Days)	Precedents
1	Specify overall system	20	
2	Specify module A	20	1
3	Specify module B	5	1
4	Specify module C	15	1
5	Specify module D	10	1
6	Check specification	3	2,3,4,5
7	Design module A	8	6
8	Design module B	4	6
9	Design module C	6	6
10	Design module D	5	6
11	Code/test module A	30	7
12	Code/test module B	20	8
13	Code/test module C	20	9
14	Code/test module D	15	10
15	System integration	7	11,12,13,14

Activity label		Duration	
Earliest start	Activity description	Earliest finish	
Latest start		Latest finish	
Activity span		Float	

