

Subject: Software Engineering (CS1606)
Answer all the following Questions.

Time: 1:30 hrs

Max. Marks: 20

Section 1: Each of the following questions carries 2 marks. (4*2 = 8 marks)

1. You have taken a job with a software user who has contracted your previous employer to develop a system for them. You discover that your company's interpretation of the requirements is different from the interpretation taken by your previous employer. Discuss what you should do in such a situation. You know that the costs to your current employer will increase if the ambiguities are not resolved. However, you have also a responsibility of confidentiality to your previous employer.
2. Apart from the challenges of heterogeneity, business and social change, and trust and security, identify other problems and challenges that software engineering is likely to face in the 21st century.
3. What is the most important difference between generic software product development and custom software development? What might this mean in practice for users of generic software products?
4. Which Lifecycle model would you follow for developing software for each of the following applications? Mention the reasons behind your choice of a particular life cycle model.
 - a) A software product that would function as the controller of a telephone switching system.
 - b) New library automation software that would link various libraries in the city.
 - c) A compiler for new language.
 - d) The graphical user interface for a large software product.

Section 2: Each of the following questions carries 3 Marks. (4*3 = 12 marks)

1. Describe the main activities in the software design process and the outputs of these activities. Using a diagram, show possible relationships between the outputs of these activities.
2. Explain why incremental development is the most effective approach for developing business software systems. Why is this model less appropriate for real-time systems engineering?
3. Considering the Cost Driver Multipliers given in Table-I and Table-II, solve the following two questions.
 - a. If your project is using 40KLOC of code and rated Very High for Complexity, Low for Tools Use, High for Virtual Machine Experience, Low for Application Experience and all of the other cost drivers are rated to be Nominal. Calculate the Effort Adjustment Factor, Effort, Duration, Average persons required and Productivity in organic mode and intermediate mode.
 - a. A software project of application generator category with estimated 80KSLOC has to be developed including 4 screens with 4 views each and 7 data tables and 2 reports of 6 sections each from 07 data tables. There is 20% reuse code of object points. The scale factor (B) has low precedent-ness, high development flexibility, low process maturity and low team cohesion while other factors are nominal. Consider the design cost drivers like High Execution Time Constraint (TIME), Very High Programmer Experience (PEXP), High Database Size (DATA), Very High Analyst Capability (ACAP), Low Required Reusability (RUSE) and all other cost drivers are nominal. Calculate the effort in person months for the development of this project in Application Composition Model and Post-architecture Model.
4. Christine Phillips is in charge of planning and coordinating next spring's sales management training program for her company. Christine has listed the following activity information for the project:

Activity	Activity Description	Immediate Predecessors	Estimated Duration
A	Select location	—	2 weeks
B	Obtain keynote speaker	—	1 week
C	Obtain other speakers	B	2 weeks
D	Make travel plans for keynote speaker	A, B	2 weeks
E	Make travel plans for other speakers	A, C	3 weeks
F	Make food arrangements	A	2 weeks
G	Negotiate hotel rates	A	1 week
H	Prepare brochure	C, G	1 week
I	Mail brochure	H	1 week
J	Take reservations	I	3 weeks
K	Prepare handouts	C, F	4 weeks

(P.T.O)

- Constructing the project network.
- Find all the paths and path lengths through this project network. Which of these paths is a critical path?
- Find the earliest times, latest times, and slack for each activity. Use this information to determine which of the paths a critical path is.
- It is now one week later, and Christine is ahead of schedule. She has already selected a location for the sales meeting, and all the other activities are right on schedule. Will this shorten the length of the project? Why or why not?

Table-I

Cost Drivers	Rating					
	Very Low	Low	Nominal	High	Very High	Extra High
Product Attributes						
Required software reliability	0.75	0.88	1.00	1.15	1.40	
Database size		0.94	1.00	1.08	1.16	
Product complexity	0.70	0.85	1.00	1.15	1.30	1.65
Computer Attributes						
Execution time constraint			1.00	1.11	1.30	1.66
Main storage constraint			1.00	1.06	1.21	1.56
Virtual machine volatility*		0.87	1.00	1.15	1.30	
Computer turnaround time		0.87	1.00	1.07	1.15	
Personnel Attributes						
Analyst capabilities	1.46	1.19	1.00	0.86	0.71	
Applications experience	1.29	1.13	1.00	0.91	0.82	
Programmer capability	1.42	1.17	1.00	0.86	0.70	
Virtual machine experience*	1.21	1.10	1.00	0.90		
Programming language experience	1.14	1.07	1.00	0.95		
Project Attributes						
Use of modern programming practices	1.24	1.10	1.00	0.91	0.82	
Use of software tools	1.24	1.10	1.00	0.91	0.83	
Required development schedule	1.23	1.08	1.00	1.04	1.10	

Table-II

Cost Driver	Rating					
	Very Low	Low	Nominal	High	Very High	Extra High
RELY	0.75	0.88	1.00	1.15	1.39	
DATA		0.93	1.00	1.09	1.19	
CPLX	0.75	0.88	1.00	1.15	1.30	1.66
RUSE		0.91	1.00	1.14	1.29	1.49
DOCU	0.89	0.95	1.00	1.06	1.13	
TIME			1.00	1.11	1.31	1.67
STOR			1.00	1.06	1.21	1.57
PVOL		0.87	1.00	1.15	1.30	
ACAP	1.50	1.22	1.00	0.83	0.67	
PCAP	1.37	1.16	1.00	0.87	0.74	
PCON	1.24	1.10	1.00	0.92	0.84	
AEXP	1.22	1.10	1.00	0.89	0.81	
PEXP	1.25	1.12	1.00	0.88	0.81	
LTEX	1.22	1.10	1.00	0.91	0.84	
TOOL	1.24	1.12	1.00	0.86	0.72	
SITE	1.25	1.10	1.00	0.92	0.84	0.78
SCED	1.29	1.10	1.00	1.00	1.00	

***** End *****