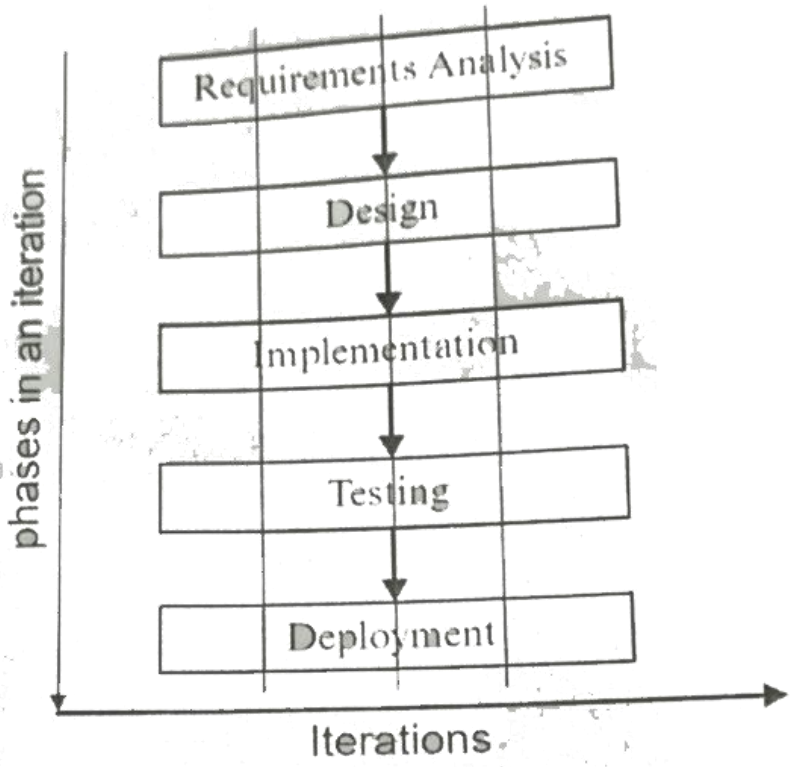
System Analysis & Design

Quiz 1

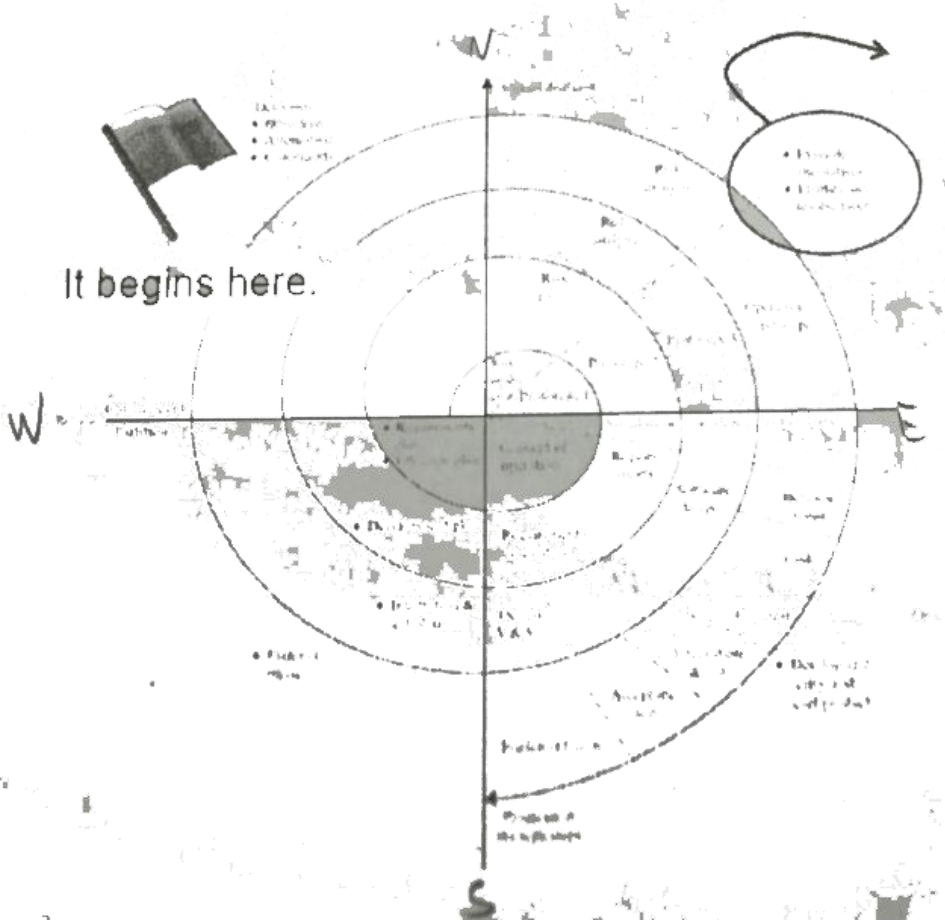
10/11/2017

1. Suppose you are an analyst working for a company to develop an executive system. The system is not big, while it needs an innovative display to summarize and drill down key facts in a quick way. The critical concern is the requirements are not so clear. It is highly required for its reliability and a short time schedulte. What type of methodology would you propose to design? Please justify your proposal. 5%
2. Suppose you are an analyst developing a new information system to automate the sales transactions and manage inventory for each retail store in a large chain. The system would be installed at each store and exchange data with a mainframe computer at the company's head office. What type of methodology would you propose to design? Please justify your proposal. 5%
3. Please create an inheritance hierarchy and the class diagram that could be used to represent the following classes: accountant, customer, department, employee, manager, organization, and salesperson. 5%
4. Please draw the diagrams for **parallel development-based** and **phased development** methodologies. 5%
5. Why the waterfall process is a process for solving tame problems and not wicked problems? 5%
6. The following figure shows a process as consisting of two axes. The horizontal axis represents the iterations and vertical axis represents the workflow activities of each iteration. What does each iteration deal with? Please explain example of ATM system. 8%




7. Fill in the suitable area depicted as map orientation, such as (EN, NE, EW, NW, ES, SE, WS, SW). 6%

## Spiral Process Model




If risks remains {
plan next phase (SW)
conduct prototyping
}
else if risks resolved {
proceed as waterfall (NE)
}
else if prototype works & robust
{
proceed as
evolutionary model (SE)
}

8. Fill in the answer for the Return on Investment and Break-Even Point as below.

4%

| Cost Benefit Analysis | 2004 | 2005 | 2006 | Total |
|---|---|---|---|---|
| Schoolwork | 3,000 | 3,100 | 3,200 | |
| Communication | 400 | 425 | 450 | |
| Entertainment | 600 | 600 | 600 | |
| Travel Moblity | 400 | 400 | 400 | |
| Digital Photo Storage | 100 | 100 | 100 | |
| Bill Payment | 50 | 50 | 50 | |
| **Total Benefits** | **4,550** | **4,675** | **4,800** | |
| **PV of Benefits** | **4,550** | **4,289** | **4,040** | **12,879** |
| **PV of All Benefits** | **4,550** | **8,839** | **12,879** | |
| | | | | |
| Computer & Case (notebook) | 3,000 | 0 | 0 | |
| **Total Development Costs** | **3,000** | **0** | **0** | |
| | | | | |
| Printing Costs | 75 | 80 | 85 | |
| Electricity | 20 | 20 | 20 | |
| Maintenance | 120 | 120 | 120 | |
| Storage Media (CD's) | 35 | 35 | 35 | |
| **Total Operational Costs** | **250** | **255** | **260** | |
| | | | | |
| **Total Costs** | **3,250** | **255** | **260** | |
| **PV of Costs** | **3,250** | **234** | **219** | **3,703** |
| **PV of All Costs** | **3,250** | **3,484** | **3,703** | |
| | | | | |
| **Total Project Benefits--Costs:** | **1,300** | **4,420** | **4,540** | |
| **Yearly NPV:** | **1,300** | **4,055** | **3,821** | **9,176** |
| **Cumulative NPV:** | **1,300** | **5,355** | **9,176** | |

**Return on Investment:** _____

**Break-even Point:** _____

9. Suppose you are studying two hardware lease proposals. Option 1 costs $4,000, but requires that the entire amount be paid in advance. Option 2 costs $5,000, but

the payments can be made $1,000 now and $1,000 per year for the next four years. If you do an NPV analysis assuming a 14 percent discount rate, which proposal is less expensive? What happens if you use an eight percent rate? 8%

10. Using the given information in the following Table, assuming that the project team will work a standard working week (5 working days in 1 week) and that all tasks will start as soon as possible. Please do the following: 1) Determine the critical path of the project and draw the PERT diagram 6%, 2) Calculate the planned duration of the project in days and weeks. 4%

| Task | Description | Duration (Working Days) | Predecessor/s |
|---|---|---|---|
| A | Requirement Analysis | 5 | |
| B | Systems Design | 15 | A |
| C | Programming | 25 | B |
| D | telecoms | 15 | B |
| E | Hardware Installation | 30 | B |
| F | Integration | 10 | C, D |
| G | System Testing | 10 | E, F |
| H | Training/Support | 5 | G |
| I | Handover and Go-Live | 5 | H |

11. We are now going to estimate project effort. Please complete the use-case point estimation worksheet as below.

**Use Case Point Estimation Worksheet**

| Actor Type | Description | Weighting Factor | Number | Result |
|---|---|---|---|---|
| Simple | External system with well-defined API | 1 | 1 | 1 |
| Average | External system using a protocol-based interface, e.g., HTTP, TCT/IP, or a database | 2 | 4 | 8 |
| Complex | Human | 3 | 2 | 6 |

***Unadjusted Actor Weight Total (UAW) =*** 15

| Use Case Type | Description | Weighting Factor | Number | Result |
|---|---|---|---|---|
| Simple | 1-3 transactions | 5 | 3 | 15 |
| Average | 4-7 transactions | 10 | 4 | 40 |
| Complex | > 7 transactions | 15 | 3 | 45 |

*Unadjusted Use Case Weight Total (UUCW) =* 100

**Unadjusted Use Case Points (UUCP) =** 2%

**Technical Complexity Factors**

| Factor Number | Description | Weight | Assigned Value (0-5) | Weighted Value |
|---|---|---|---|---|
| T1 | Distributed system | 2.0 | 4 | 8 |
| T2 | Response time or throughput performance objectives | 1.0 | 5 | 5 |
| T3 | End-user online efficiency | 1.0 | 3 | 3 |
| T4 | Complex internal processing | 1.0 | 1 | 1 |
| T5 | Reusability of code | 1.0 | 1 | 1 |
| T6 | Easy to install | 0.5 | 5 | 2.5 |
| T7 | Ease of use | 0.5 | 4 | 2 |
| T8 | Portability | 2.0 | 4 | 8 |
| T9 | Ease of change | 1.0 | 2 | 2 |
| T10 | Concurrency | 1.0 | 5 | 5 |
| T11 | Special security objectives included | 1.0 | 2 | 2 |
| T12 | Direct access for third parties | 1.0 | 2 | 2 |
| T13 | Special user training required | 1.0 | 3 | 3 |

***Technical Factor Value (TFactor) =*** 44.5

***Technical Complexity Factor (TCF) =*** 2%

**Environmental Factors**

| Factor Number | Description | Weight | Assigned Value (0-5) | Weighted Value |
|---|---|---|---|---|
| E1 | Familiarity with system development process being used | 1.5 | 5 | 7.5 |
| E2 | Application experience | 0.5 | 2 | 1 |
| E3 | Object-oriented experience | 1.0 | 5 | 5 |
| E4 | Lead analyst capability | 0.5 | 5 | 2.5 |
| E5 | Motivation | 1.0 | 5 | 5 |

| | | | | |
|---|---|---|---|---|
| E6 | Requirements stability | 2.0 | 5 | 10 |
| E7 | Part time staff | -1.0 | 4 | -4 |
| E8 | Difficulty of programming language | -1.0 | 4 | -4 |

***Environmental Factor Value (EFactor)*** = 23

***Environmental Factor (EF)*** = _____ 2%

***Adjusted Use Case Points (UCP)*** = _____ 2%

***PHM* (Person-hours multiplier)**

If the sum of (number of Efactors E1 through E6 assigned value < 3) and (number of Efactors E7 and E8 assigned value > 3) <= 2

PHM = 20

Else If the sum of (number of Efactors E1 through E6 assigned value < 3) and (number of Efactors E7 and E8 assigned value > 3) = 3 or 4

PHM = 28

Else

Rethink project; it has too high og a risk for failure

***Effort in Personal Hours*** = _____ 3%

Plugging the values of UCP and PHM into the effort equation, what is the estimated number of person-hours? _____ 3%

12. Kitchen Gadgets sells a line of high-quality kitchen utensils and gadgets. When customers place orders on the company's Web, the system checks to see if the items are in stock, issues a status message to the customer, and generates a shipping order to the warehouse, which fills the order. When the order is shipped, the customer is billed. The system also produces various reports. Please draw a context diagram 5% and a diagram 0 DFD for the order system. 10%

13. Create a decision table and a decision tree for a company based on the following situation.

If a new customer wants to open a credit card account then there are three conditions: **first**, a customer will get a 15% discount on all his/her purchases today, **second**, if the customer is an existing customer and he/she hold a loyalty card, the customer get a 10% discount and **third**, if a customer has a coupon, he/she can get 20% off today (but it can't be used with the 'new customer' discount). Remember, a customer cannot be both a new customer and also holding a loyalty card. Please write down the discount amounts in the action row, if applicable and choose the higher discount rate as the result. 10%

| Conditions | Rule 1 | Rule 2 | Rule 3 | Rule 4 | Rule 5 | Rule 6 | Rule 7 | Rule 8 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Actions | | | | | | | | |
| Discount (%) | | | | | | | | |