BITS, Pilani – Dubai
Dubai International Academic City, Dubai

IV Year (CS)
Second Semester, 2007-2008

Comprehensive Examination – Closed Book

Course No: BITS UC461   Course Title: Software Engineering
Date: 26th May 2008   Weightage: 40%
Duration: 3 hours   Max. Marks. 80

Answer all questions . All questions carry equal marks.

1. (a) Compare and contrast the different life cycle models in software engineering.
    (b) What is CMM? Discuss the different levels of CMM.

2. (a) What are functional and non-functional requirements? Give an   (5)
    example for each of them.
    (b) Give an SRS report for building a library search catalog.

3. (a) Define Coupling and Cohesion. Give an example each for weak   (5)
    coupling and weak cohesion. Refine the same examples to show strong
    coupling and strong cohesion.
    (b) What is the difference between top down design and bottom up   (5)
    design? Explain using structure chart. Under what circumstances would
    you prefer one over the other?

4. (a) Can a transactional flow and transformational flow, both be a part of
    one single DFD. Illustrate your answer with the help of an example DFD. (5)
    (b) Differentiate between   (5)
    (i) Reusability and Usability
    (ii) Interoperability and Portability

5. Which of the following UML diagrams are interrelated   (10)
    (i)   Use Case Diagram
    (ii)   Class Diagram
    (iii)   Sequence Diagram
    Show how they are interrelated by with the help of an example and drawing
    the diagrams.

6. For the statements given below draw   (10)
        (a) Flow Chart
        (b) CFG
        And compute the number of test paths

1. Input two real, finite numbers A and B within the maximum and minimum range of computer numbers
2. If A > = 0 set Y = 1
3. If A < 0 set Y = 0
4. If B > = 0 set Z = 1
5. If B < 0 set Z = 0
6. Print A, B, Y, Z

7. Explain the different metrics that are available for assessing functional and non-functional requirement. (10)

8. Write short notes on
   a. Configuration Management   b. COCOMO   (10)

♣♣♣♣♣

Software Engineering – BITS UC461
Test 2 (Open Book)

Date: 27 Apr 2008
Time: 50 min   **Max Marks: 20**

Answer all questions

1. A company tracks current customer status to help avoid uncollectable receivables and identify customers worthy of preferred treatment. All customers are initially set up as prospects, but when they place their first order, they are considered to be active. If a customer doesn't pay an invoice on time, he is placed on probation. If he does pay on time and has ordered more than $10,000 in the previous six months, he warrants preferred status. Preferred status may be changed only if the customer is late on two or more payments. Then he returns to active status rather than probation, giving him the benefit of the doubt based on his preferred history. Which UML diagram would you choose to model the requested aspect of the system and why? Draw the diagram   4 mks

2. Many commuter train and bus services now provide passengers with an information display at each stop, to show the time in minutes until the next bus or train is expected to arrive, and its route number or destination. Your employer the MovinIT company provides IT solutions to the transport industry sector. The MovinIT company has decided to design a computer software system that will provide such a bus-stop information service. Suggest requirements that you would handle and propose a high level architectural to solve this problem   5 mks

3. a. If a programmer has two integer inputs and each can be 32 bit integers, how many possible inputs does this procedure have   1 mks

b. Given the following code, draw the CFG and generate a minimal set of test cases   5 mks

```
cin>> a >> b // node A
if (b>a) {
        x = b; // node B
        if (b>20) {
                x = x + 9; // node C
        }
        else {
                x = x + 1; // node D
        }
        x = x + 1; // node E
}
else
        x = a // node F
```

```
        if (a > 20){
                x = x + 15; // node G
        }
        x = x – 5; // node H
}
if (b > a + 20) // node I
{
        x = 20; // node J
}
cout << x; // node K
```

4. Compute the program length using Hallstead's formula for the code given below

5 mks

```
scanf("%d %d %d", &a, &b, &c);
avg = (a + b + c) / 3;
printf("avg = %d", avg);
```

Date: 16 Mar 2008
Time: 50 min

Max Marks: 25

Answer all questions

1. SatWatch is a wrist watch that displays the time based on its current location. State which of the following requirements are functional / non-functional and state why?

1.5 mks
   a. A user should be able to read a digital watch without referring to the manual
   b. The digital watch should display time correctly in all the 24 time zones
   c. SatWatch should use GPS satellites (Global Positioning System) to determine its location and convert this location into a time zone.

2. Draw a diagram that represents an iterative life cycle model. Clearly label the diagram.

1.5 mks

3. A library system handles books, magazines, CDs and newspapers. Identify the commonalities and draw a class diagram to represent these items   3 mks

4. Differentiate between   8 mks
a. Level 3 and level 4 of CMM
b. Data coupling and Stamp Coupling
c. Interoperability and Portability
d. Encapsulation and Inheritance

5. For the DFD shown in fig 1 produce a structure chart from it.   6 mks

6. You are asked to build an email browser (Example: Gmail, Microsoft Outlook)
   a. Identify the actors and the use cases for an email browser and draw the use case diagram.   3 mks
   b. Define an interface for the email browser (Use class diagram notation)   2 mks

fig 1 : DFD for interpreting 2 commands in UNIX