FINAL EXAM
SECOND SEMESTER SESSION 2011/2012

COURSE CODE / NAME : STID3163 SOFTWARE ENGINEERING
DATE : 28 JUNE 2012 (THURSDAY)
TIME : 2.30 – 5.00 P.M (2 ½ HOURS)
VENUE : TE

INSTRUCTIONS :

1. This exam paper contains SECTION A (17 questions) and SECTION B (2 questions) in ELEVEN (11) printed pages, excluding the cover page.
2. Answer ALL QUESTIONS on the space provided.
3. You are NOT ALLOWED to remove the exam paper from the examination hall.

MATRIC NO : ____________________________ ( with word ) ____________________________ ( with number )
IDENTIFICATION CARD NO. :
LECTURER : ____________________________
GROUP : [ ] TABLE NO. :

DO NOT OPEN THIS EXAMINATION PAPER UNTIL INSTRUCTED

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SECTION A (80 MARKS)

1. List THREE (3) reasons for a software project fails to be successfully delivered to the customer. (3 marks)

2. Describe ONE (1) example related to the following issues of professional responsibility as a software engineer. (4 marks)
   
a) Competence

b) Computer misuse
3. Suppose you are involved in the development of a project management system project for a hospital. Throughout the project you are facing some problems including relatively short project duration, requests for abnormalities by customers and often changes in requirements during development (before the software is completely developed and delivered to users). In addition, the customer also concerns on the issues of quality.

a) List **TWO (2)** core software engineering principles that are important in overcoming these problems.

   (2 marks)

b) List **TWO (2)** principles that should be practiced while having communication with the customers.

   (2 marks)

4. Describe briefly **TWO (2)** types of evolutionary development approach.

   (4 marks)
5. Identify **ONE (1)** software process model that is appropriate for the following presentations:

   a) Sequential

   b) Reuse

   c) Evolutionary

6. Explain **TWO (2)** concepts underlying the philosophies of Agile Software Development.

   (4 marks)

7. Software implementation is one of the four software process activities. What is software implementation?

   (2 marks)
8. Identify the process model that corresponds to the following description:

a) This software process is used to refine user requirements based on user's feedback and comments.  
   (2 marks)

b) There is no single programmer and this software process emphasizes on teamwork collaboration in self-organization team.  
   (2 marks)

c) Unified Modeling Language (UML) diagrams are used to capture the functional requirements and define the contents of the iteration.  
   (2 marks)

d) Programmers have to work in parallel and create fully functional software within a short time.  
   (2 marks)

9. Describe the following terms:

a) Black-box testing  
   (2 marks)

b) Test cases  
   (2 marks)
10. Explain THREE (3) types of software maintenance.
11. What is software reengineering? Provide TWO (2) advantages of software reengineering. 

(6 marks)

12. Explain ONE (1) benefit of software reuse and ONE (1) problem that occurred during software reuse. 

(4 marks)
13. What is component model? List two (2) examples of component model. (6 marks)

14. Describe two (2) differences between software quality and software testing. (4 marks)
15. Complete the following table by identifying a quality factor that best fits the following requirement.

(6 marks)

<table>
<thead>
<tr>
<th>No.</th>
<th>Requirement</th>
<th>Quality Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The probability that the ABC software system will be found in a state of failure during peak hours (9 am to 4 pm) is required to be below 0.5%.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>The system will report attempts by unauthorized persons to obtain medical information from the laboratory test results database.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The ABC software package developed for the Linux operating system should be compatible for applications in a Windows NT environment.</td>
<td></td>
</tr>
</tbody>
</table>

16. What is purpose of software process maturity model? List TWO (2) examples of software process maturity model.

(4 marks)

17. Describe TWO (2) purposes of software configuration management.

(4 marks)
STID3163 Software Engineering

SECTION B (20 MARKS)

Question 1

Based on the Java program given, answer the following questions:

```java
int sum = 0, next = 8;
while (next >= 0)
{
    sum = sum + next
}
if (sum > 0)
    System.out.println(sum);
else
    System.out.println(next);
System.out.println("END");
```

a) Draw a flow graph to represent the given program.  
(7 marks)

b) Based on the constructed flow graph in question 1(a), calculate the cyclomatic complexity value for the program. 
(2 marks)
Question 2
Based on the following table, answer the following questions:

<table>
<thead>
<tr>
<th>Task</th>
<th>Duration (days)</th>
<th>Dependencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>T2</td>
<td>15</td>
<td>T1 (M1)</td>
</tr>
<tr>
<td>T3</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>T4</td>
<td>9</td>
<td>T2, T3 (M2)</td>
</tr>
<tr>
<td>T5</td>
<td>10</td>
<td>T4 (M3)</td>
</tr>
<tr>
<td>T6</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>T7</td>
<td>20</td>
<td>T6 (M4)</td>
</tr>
</tbody>
</table>

a) Draw the corresponding activity network diagram. (7 marks)
b) Identify the critical path. (2 marks)

c) How long can T7 be delayed without affecting the completion duration of the project? (2 marks)