University of Rajshahi

Department of Computer Science and Engineering

B. Sc. (Engg.) Part-III Even Semester Examination 2020

Course: CSE-3211 (Software Engineering)

Full Marks: 52.5 Duration: 3(Three) Hours

Answer 06(Six) questions taking any 03(Three) questions from each part

Part-A

1. a) Define software and explain evolving role of software. What is the difference between generic and bespoke software products? 2.75
   b) Draw the failure curves for hardware and software. L-1 4-21 2
   c) What is software engineering? Describe the different software components in detail. 4

2. a) Discuss Rational Unified Process and its phases. slide-2 pg-18 5.75
   b) State the Agility principles. slide-2 pg-54 3

3. a) Write the characteristics of a good software requirement. Why it is difficult to get good requirement? slide-3 pg-3 3.5
   b) Differentiate between functional and non-functional requirement. slide-3 pg-6 3
   c) State the format of a SRS document. slide-3 pg-34 2.25

4. a) Discuss the four P's of effective project management. People, Product, Process, project slide-7 pg-4 4
   b) When is a project get into jeopardy? bipod slide-7 pg-21 2.5
   c) What is the W^5HH principle? slide-7 pg-23 2.25

Part-B

5. a) What are the goals of software design process? slide-4 pg-9 ACID = Architecture, Component, Interface, Data 1.5
   b) Why is functional independence important for effective modular software design? How could we measure functional independence? slide-4 pg-36 3
   c) What is UML? Why we use UML? slide-5 pg-3-5 1.75
   d) Compare data-centered and data flow software architecture. slide-6 pg-10-13 2.5

6. a) Write the software testing principles. slide-9 pg-4 2.25
   b) What does mean by software testability? Briefly explain its characteristics. slide-9 pg-5-7 5.5
   c) When the orthogonal array testing can be applied? slide-9 pg-42 1

7. a) What does mean by software verification and validation? slide-10 pg-3 2
   b) Explain the top-down integration testing. Why problems may occur in top-down integration? slide-10 pg-21-25 3.75
   c) Distinguish between alpha and beta testing. slide-10 pg-42-44 3

8. a) Differentiate between reactive and proactive risk management. 2
   b) Discuss about the different types of software risks. 3
   c) Define Software Quality Assurance (SQA). Write down the different roles of an SQA group. 3.75

Rajshahi University
Department of Computer Science and Engineering
B.Sc. Engineering Part-III (Odd semester) Examination-2019
Course: CSE3111 (Software Engineering)
Time: 3 hours, Marks: 52.5

Answer six questions taking at least three from each of the sections.

SECTION-A

1. a) Define software engineering. Discuss the scope and necessity of software engineering. 4 s-1 p10
   b) Identify at least four basic characteristics that differentiate a simple program from a software product. 2
   c) State five symptoms of the present software crisis. s-1 pg-25-26 2.75

2. a) What is a software life cycle model? Explain the problems that might be faced by an organization if it does not follow any software life cycle model. s-1 pg-38 3
   b) What are the phase entry and phase exit criteria of classical waterfall model? 2.75
   c) Identify at least two activities carried out during each quadrant of the spiral model. 3 s-2 pg-47-51

3. a) Suggest why it is important to make a distinction between developing the user requirements and developing system requirements in the requirements engineering process. 2
   b) Giving reasons for your answer based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems: 4
      i. A system to control anti-lock braking in a car waterfall model
      ii. A virtual reality system to support software maintenance incremental model
      iii. A university accounting system that replaces an existing system waterfall
      iv. An interactive travel planning system that helps users plan journeys with the lowest environmental impact .prototype, incremental development, spiral
   c) Is it possible to combine process model? If so, provide an example. 2.75

4. a) What is an agile process? Mention some of the principles defined by the agile alliance in their manifesto. 3
   b) How does pair programming work? Write its advantages and disadvantages. 2.75
   c) In scrum meeting, what are the key questions asked? Who ask the questions to whom? 3

SECTION-B

5. a) What are the three main types of system testing? Explain them. 1.75
   b) Briefly describe the software testing life cycle. 3.5
   c) What performance tests are carried out to check whether the system needs the nonfunctional requirements identified in the SRS document? 3.5

6. a) What for software products are required to maintain? 2
   b) What are the different types of maintenance that a software product might need? Why 2

are these maintenances required?

c) What are the different factors upon which software maintenance activities depend? 2

d) What do you mean by the term software reverse engineering? Why is it required? 2.75
Explain the different activities undertaken during reverse engineering.

7. a) A novice software engineer has the following beliefs. Give and explain your opinion for each of the cases: 6

   i) Software engineering requires unnecessary documentation, which slows down the project.

   ii) Software is flexible; so software requirement changes can be added during any phase of the development process.

   iii) If the project time schedule fails, time gap can be reduced by increasing the number of programmers.

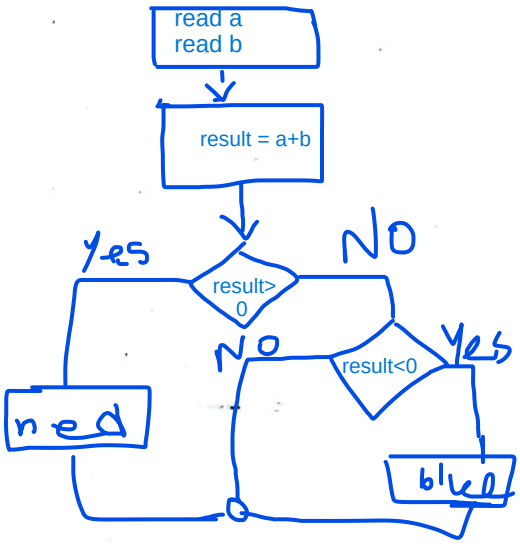
   b) Give some examples of known and unpredictable risks. 2.75

8. a) Using your own words, describe the difference between *verification* and *validation*. Do both make use of test-case design methods and testing strategies? 2

   b) Draw control flow graph from the following function and produce test cases to achieve 100% 6.75

   a) Statement Coverage
   b) Branch coverage.
   c) Condition Coverage

```
void printSum(int a, int b){
        int result = a + b;
        if(result > 0)
                printcol("red", result);
        else if(result < 0)
                printcol("blue", result);
        else
                do nothing
}
```



University of Rajshahi
Department of Computer Science and Engineering
B.Sc.(Engg.) Part-3, Odd Semester, Examination-2018
Course: CSE3111 (Software Engineering)

Time: 3 Hours Marks: 52

ANSWER ANY THREE FROM EACH SECTION

Section A

1. a) Define Software and Software Engineering. 3

   b) Is software engineering applicable when WebApps are built? If so, how might it be modified to accommodate the unique characteristics of WebApps? 3

   c) Many modern applications change frequently before they are presented to the end user and then after the first version has been put into use. Suggest a few ways to build software to stop deterioration due to change. 2.75

2. a) In Baetjer notes: "The process provides interaction between users and designers, between users and evolving tools, and between designers and evolving tools [technology]." List five questions that (1) designers should ask users, (2) users should ask designers, (3) users should ask themselves about the software product that is to be built, (4) designers should ask themselves about the software product that is to be built and the process that will be used to build it. 5

   b) What are the advantages and disadvantages of developing software in which quality is "good enough"? That is, what happens when we emphasize development speed over product quality? 2

   c) It is possible to prove that a software component and even an entire program is correct. So why doesn't everyone do this? 1.75

3. a) Describe agility (for software projects) in your own words. 3

   b) Most agile process models recommend face-to-face communication. Yet today, members of a software team and their customers may be geographically separated from one another. Do you think this implies that geographical separation is something to avoid? Can you think of ways to overcome this problem? 2.75

   c) Why do requirements change so much? After all, don't people know what they want? 3

4. a) Is it possible for any system to be optimized for all software quality attributes? Explain your answer. 3

   b) Why software standards are important for quality assurance? Explain why a high-quality software process should lead to a high quality software product. 3

   c) What is software metrics? Describe the metrics for object-oriented design. 2.75

Section B

5. a) Why is it that many software developers don't pay enough attention to requirements engineering? Are there ever circumstances where you can skip it? 2

   b) Develop a complete use case for the following activity: Searching for books (on a specific topic) using an online bookstore. 4.75

   c) What do you think happens when requirement validation uncovers an error? Who is involved in correcting the error? 2

6. a) You have been asked to develop a system that will help with planning large-scale events and parties such as weddings, graduation celebrations, birthday parties, etc. Using an activity diagram, model the process context for such a system that shows the activities involved in planning a party (booking a venue, organizing invitations, etc.) and the system elements that may be used at each stage. 3.75

   b) Develop a sequence diagram showing the interactions involved when a student registers for a course in a university. Courses may have limited enrollment, so the registration process must include checks that places are available. Assume that the student accesses an electronic course catalog to find out about available courses. 4

   c) Does "refactoring" mean that you modify the entire design iteratively? If not, what does it mean? 1

7. a) Using your own words, describe the difference between *verification* and *validation*. Do both make use of test-case design methods and testing strategies? 2

   b) Draw control flow graph from the following function and produce test cases to achieve 100% 6.75
      a) Statement Coverage
      b) Branch coverage.
      c) Condition Coverage

```
Read A
Read B
IF A+B > 10 THEN
  Print "A+B is Large"
ENDIF
If A > 5 THEN
  Print "A Large"
ENDIF
```

8. a) Define Alpha, Beta and Acceptance testing. Draw the block diagram of acceptance testing process. 3.75

   b) What are the benefits of involving users in release testing at an early stage in the testing process? Are there disadvantages in user involvement? 2

   c) Describe the fundamental process of Test-Driven Development (TDD) approach with the help of appropriate figure. 3

University of Rajshahi
Department of Computer Science and Engineering
B. Sc. (Engg.) Part-III Odd Semester Examination 2017
Course: CSE 3111 (Software Engineering)
Full Marks: 52.5 **Time: 3 Hours**

[Answer any Six of the following questions taking three from each section]

Part A

Question 1.

a) Define Software and Software Engineering. 2

b) To help counter terrorism, many countries are planning or have developed computer systems that track large numbers of their citizens and their actions. Clearly this has privacy implications. Discuss the ethics of working on the development of this type of system. 3

c) Why are large number of legacy software systems written more than 10 years ago still being used today? 3.75

Question 2.

a) Suggest why it is important to make a distinction between developing the user requirements and developing system requirements in the requirements engineering process. 2

b) Giving reasons for your answer based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems: 4

i. A system to control anti-lock braking in a car
ii. A virtual reality system to support software maintenance
iii. A university accounting system that replaces an existing system
iv. An interactive travel planning system that helps users plan journeys with the lowest environmental impact

c) Is it possible to combine process model? If so, provide an example. 2.75

Question 3.

a) Explain why test-first development helps the programmer to develop a better understanding of the system requirements. What are the potential difficulties with test-first development? 3

b) Most agile process models recommend face-to-face communication. Yet today, members of a software team and their customers may be geographically separated from one another. Do you think this implies that geographical separation is something to avoid? Can you think of ways to overcome this problem? 2.75

c) To reduce costs and the environmental impact of commuting, your company decides to close a number of offices and to provide support for staff to work from home. 3

However, the senior management who introduce the policy are unware that the software is developed using agile methods, which rely on close team working and pair programming. Discuss the difficulties that this new policy might cause and how you might get around these problems.

Question 4.

a) What is legacy software? Why should we improve this type of software and how? 2.75

b) Write down the steps for level 1, level 2 and level 3 ER-diagram generation processes. 3

c) What are the differences between the analysis and the data modeling techniques? 3

Part B

Question 5.

a) Develop a sequence diagram showing the interactions involved when a student registers for a course in a university. Courses may have limited enrollment, so the registration process must include checks that places are available. Assume that the student accesses an electronic course catalog to find out about available courses. 3

b) Rajshahi City Corporation has decided to develop a Web-based pothole tracking and repair system (PHTRS). A description follows: 5.75

Citizens can log onto a website and report the location and severity of potholes. As potholes are reported they are logged within a "city corporation's repair system" and are assigned an identifying number, stored by street address, size (on a scale of 1 to 10), location (middle, curb, etc.), zone (determined from street address), and repair priority (determined from the size of the pothole).

Work order data are associated with each pothole and include pothole location and size, repair crew identifying number, number of people on crew, equipment assigned, hours applied to repair, hole status (work in progress, repaired, temporary repair, not repaired), amount of filler material used, and cost of repair (computed from hours applied, number of people, material and equipment used).

Finally, a damage file is created to hold information about reported damage due to the pothole and includes citizen's name, address, phone number, type of damage, and taka amount of damage. PHTRS is an online system; all queries are to be made interactively.

i. Draw a UML use case diagram for the PHTRS system. You'll have to make a number of assumptions about the manner in which a user interacts with this system.

ii. Develop a class model for the PHTRS system.

Question 6.

a) Using your own words, describe the difference between *verification* and *validation*. Do both make use of test-case design methods and testing strategies? 2

b) Draw control flow graph from the following function and produce test cases to 6.75

University of Rajshahi

Department of Computer Science and Engineering

B.Sc. (Engg.) Part – III (Even Semester), Examination – 2016

Course: CSE-3211 (Software Engineering)

Marks: 52.5 Times: 3 Hours

[Answer any six questions taking at least three from each part.]

PART-A

1. a) What are the differences between software engineering and computer science? 3
   b) Software engineering is a layered technology- explain briefly. 2.75
   c) Describe the different kind of software myths with examples. 3

2. a) Write the main differences between the prototype and the incremental software development model. 3
   b) Compare between RAD and spiral software development model. 3.50
   c) When we can use the water fall software development model? 2.25

3. a) What is an agile process? Mention some of the principles defined by the agile alliance in their manifesto. 3
   b) How does pair programming work? Write its advantages and disadvantages. 2.75
   c) In scrum meeting, what are the key questions asked? Who ask the questions to whom? 3

4. a) What is a class diagram in software engineering? 2.25
   b) Write the main functionalities of Use-Case diagram. 3
   c) Distinguish between Use-Case and activity diagram. 3.50

PART-B

5. a) Compare between unit testing and integration testing. 3
   b) Describe briefly the software testing life cycle. 3.50
   c) Discuss about high-order testing and smoke testing. 2.25

6. a) What are the distinguishing features among creational, behavioral and structural design patterns? 3
   b) Describe MVC framework with figure and mention some of its benefits. 3
   c) Describe the Brute-Force debugging technique. 2.75

7. a) Write down McCall's quality factors that affect software quality. 3
   b) What do you mean by quality assurance of computer software? 2
   c) Describe briefly the elements of software quality assurance. 3.75

8. a) Describe the software project management activities. 2.50
   b) What factors should be considered for building a good software development team. 3.25
   c) Describe the software plan structure briefly. 3

University of Rajshahi

Department of Computer Science and Engineering

B.Sc. (Engg.) Part-III (Even Semester) Examination 2015

Course: CSE3211 (Software Engineering)

Full Marks: 52.5 **Time: 3 Hours**

[Answer any six (06) questions taking three questions from each part]

Part-A

1. (a) What does 'win-win' mean in the context of negotiation during the requirements engineering activity? 2.75

   (b) Italian economist Vilfredo Pareto showed that approximately 80% of the land in Italy was owned by 20% of the population. Based on his observation, Pareto principle or 80-20 rule was proposed. In business it is interpreted as '80% of the sales of a company come from 20% of its customers'. In software engineering, where can you justify this principle? Explain with examples. 3

   (c) What does make a difference between a group of software engineers and a team of software engineers? During working on your project how did you try to act---act as a group or act as a team? Which steps did you take to become a successful group or a team? Were you benefited by your steps? Briefly explain reasons behind it. 3

2. Assume you are appointed as a leader of a software project having 20 people working on it. Some members are extroverts; others are introverts. Some people gather information intuitively, extracting important aspects from different facts. Others process information linearly, collecting and organizing minute details from the data provided. Some members are comfortable making decisions only when a logical, orderly argument is presented. Others are intuitive, willing to make a decision based on 'feel'. Some members want a detailed schedule populated by organized tasks that enable them to achieve closures for some elements of a project. Others prefer a more spontaneous environment in which open issues are okay. Some work hard to get things done long before a deadline, thereby avoiding stress as the date approaches, while others are energized by the rush to make a last-minute deadline. 8.75

   What strategy will you follow to motivate all those people working together and finish project on time? Will you be biased to a specific group of members? Justify your answer.

3. (a) In 'Pair Programming', two programmers work together at one workstation. It is an agile software development technique in which one writes code while the other reviews each line of code as it is typed in. The first person is called the driver, while the second person is called the observer or the navigator. The roles of two programmers can be switched frequently. 4

   Some software engineers are enthusiastic about pair programming, while others are doubtful, even hostile about it. What is your opinion about this

programming technique and why?

(b) Write down some reasons for late delivery of a software. 4.75

4. (a) What is class diagram in software engineering? 2.25

(b) Write the main functionalities of Use-Case diagram. 3

(c) Write the differences between the Use-Case and activity diagram. 3.5

Part-B

5. (a) Compare between unit testing and integration testing. 3

(b) Describe briefly the software testing life cycle. 3.5

(c) Describe about high-order testing and smoke testing. 2.25

6. (a) A novice software engineer has the following beliefs. Do you agree with the engineer? Justify your opinion. 6

(i) Software engineering requires unnecessary documentation, which slows down the project.

(ii) Software is flexible; hence software requirement changes can be added during any phase of the development process.

(iii) If the project is behind schedule, increasing the number of programmers can reduce the time gap.

(b) Give examples of known risks and unpredictable risks. 2.75

7. (a) According to German computer scientist and professor, Friedrich L. Bauer, "Software Engineering is the establishment and use of sound engineering principles to economically obtain software that is reliable and works on real machines efficiently". 3.75

According to IEEE's definition, "Software Engineering is the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software, and the study of these approaches; that is, the application of engineering to software".

According to a novice software engineer, "Software engineering is a scientific way to reduce risk of failure rate of a big software project and deliver a high quality software on time".

How do you define software engineering?

(b) Which is the right development methodology for your project: Agile or Waterfall? Justify your answer by mentioning positive points of your chosen methodology and negative points of other methodology. 5

8. Assume that you are assigned to develop a web portal for our farmers. Through this portal farmers will be able to know necessary information about crops and animals, contact agriculture officers for suggestions, check current market price, know about all well-known bazars, send complaints to ministry of Agriculture, buy and sell crops and animals, be friends with other farmers and do many other things. Describe each phases of your development process. 8.75

University of Rajshahi
Department of Computer Science and Engineering
B. Sc. (Engg.) Part-III Even Semester Examination 2017 (Session 2012-13)
Course: CSE 3211 (Software Engineering)
Full Marks: 52.5 Time: 3 Hours
[Answer any six questions taking 3 from each Section]

Section-A

1. a) What is Software Engineering? What are the objectives of Software Engineering? 2.5
   b) Describe briefly the measurement qualities of good software. 3.25
   c) Explain the term "Software is developed or engineered; it is not manufactured in the classical sense". 3

2. a) What is process flow? Discuss different process flow with block diagram. 3
   b) Briefly explain the advantages and limitations of waterfall model. 3
   c) Differentiate between prototyping and spiral process model. 2.75

3. a) What is legacy software? Why should we improve this type of software and how? 2.75
   b) Write down the steps for level 1, level 2 and level 3 ER-diagram generation processes. 3
   c) What are the differences between the analysis and the data modeling techniques? 3

4. a) What are the most common and important goals of software project management? 2.75
   b) Why Software project management is more challenging than other project management tasks? Explain. 3
   c) What is the meaning of the term "Risk" in software industries? Discus how can we classify software risks. 3

Section-B

5. a) Briefly discuss the elements of software quality assurance. 2.75
   b) Define software testing. What are the objectives of software testing? 3
   c) Discuss black-box testing method in brief. 3

6. a) Write down the differences between "User documentation" and "Internal documentation". 3
   b) Write down the advantages and disadvantages of TOP-DOWN and BOTTOM-UP structure programming. 5.75

7. a) Who are the stakeholders of a software project? 2
   b) What are the characteristics of an effective team manager? 3
   c) What factors should be considered for building a good software development team. 3.75

8. a) Discuss different types of needs that should be considered to motivate people form a management point of view. 2
   b) Describe event-driven system architecture model with advantages and disadvantages. 2.25
   c) Design an architectural model for an automated ticket-issuing system by passengers at a railway station and give reasons why you choose this architecture. 4.5