Jahangirnagar University

Department of Computer Science and Engineering

4th Year 1st Semester B.Sc. (Hons.) Final Examination -2021

Course Title: **Software Testing and Quality Assurance** Course No: **CSE-411**

Time: **2 hours** Full Marks: **30**

[Answer each of the following sections. Figures in the right margin indicate marks.]

Section-A

Answer all of the following questions.

1. a) Define error and verification. 2
   b) How should user acceptance testing be performed? 2
   c) What is functional testing? 2

Section-B

Answer any **three** of the following four questions.

2. a) Explain the following terminologies in the context of software with example. 2

   i) Quality Assurance (SQA) ii) Quality Control (SQC)

   iii) Quality Planning (SQP) iv) Quality Metrics (SQM)

   b) Following code segment count odd or positive numbers in any given array inputs. 2

```
public static int oddOrPositive(int []inputs){
  int count=0;
  for(int i=0; i<inputs.length; i++) {
    if(inputs[i]%2==1 || inputs[i]>0){
      count++;
    }
  }
  return count;
}
```

   i) Explain what is wrong with the given code. Describe the fault precisely by proposing a modification to the code.

   ii) If possible, identify a test case that results in a failure. If not, briefly explain why not.

   c) Assume that, while doing ISP we found ~~three~~ 4 characteristics $\{A, B, C, D\}$ and each of the characteristics are partitioned into following blocks: 2

   $\{(A1, A2, A3, A4), (B1, B2, B3), (C1, C2, C3, C4), (D1, D2)\}$.

   Now, answer each of the following questions:

   i) How many test cases we will get for all combination coverage?

   ii) How many test cases we will get for each choice coverage?

   iii) How many test cases we will get for base choice coverage?

   iv) How many test cases we will get for 3-wise coverage?

   d) Discuss the seven principles of Software Testing. 2

Section-C

Answer any **three** of the following four questions.

3. a) Sketch the block diagram of Capability Maturity Model Integration(CMMI) Architecture. 2
   b) Illustrate the block diagram of Model Driven Test Design steps. 2
   c) Demonstrate software testing V-model with necessary diagram. 2
   d) Illustrate the control flow graph of the following code segment. 2

```
int binarySearch(int arr[],int key, int length)
{
    int low, mid, high;
    low=0;
    high=length-1;
    while(low<=high)
    {
        mid=(low+high)/2;
        if(arr[mid]>key){
            high=mid-1;
        }
        else if(arr[mid]<key){
            low=mid+1;
        }
        else{
            return mid;
        }
    }

    return -1;
}
```

Section-D

Answer any **two** of the following three questions.

4. a) Distinguish between debugging and testing. 3
   b) Differentiate between functional and non-functional testing. 3
   c) Distinguish among smoke, sanity and regression testing. 3

Section-E

Answer any **one** of the following two questions.

5. a) *"When reporting faults found to developers, testers should be as polite, constructive, and helpful as possible, but firm about insisting that a bug is not a "feature" if it should be fixed. They should be diplomatic, sensitive to the way they may react to criticism."* 6

   Evaluate the statement for the case of testing team whether they should follow or not.

   b) There was a discussion going on in a coffee corner of a large software development organization on "good software testing". Mr. X comments that good testing should be for every development activity, there is corresponding testing activity. However, Mr. Y differs that testers should be involved in reviewing documents as soon as drafts are available in the development life cycle in order to get a very good testing outcome. Another tester M, Z said "Test analysis and development should begin during the corresponding development activity." He also added that each test level has specific test objectives. Appraise the conversations in context with "Good Software Testing." 6

d) Define AI ethics citing a real-life situation where ethics is very important.

e) What are the parameters to measure the performance of a rational agent?

f) List out the knowledge representation techniques that you have learned in this course.

Department of CSE, JU
Tutorial Examination
CSE 459: Data Mining

1. Explain why we are drowning in data but starving for knowledge. What is the solution to the data explosion problem?
2. Describe the KDD process with diagram.
3. Define the terms: Classification, Decision tree, Outlier mining.
4. Define fact and dimension table with example.
5. Define the primitives for defining DMQL expression.

b) State the old and new visions of AI.
c) Define knowledge along with an example.
d) Define AI ethics citing a real-life situation where ethics is very important.
e) What are the parameters to measure the performance of a rational agent?
representation techniques that you have learned in this course.

Dept. of CSE, JU
Tutorial Examination
CSE 459: Data Mining

1. Describe the general approach for building a classification model. 3
2. Explain decision tree induction for decision tree construction. 4
3. Explain how the Hunt's algorithm terminates and recourses for creating new branches with new nodes. 4
4. Explain the use of Bayesian classifier for classification. 4

Predict the conclusion, [mention the
Lata is older than Tahira.

d) Show a parse tree for the following English sentence:
She was born in Dinajpur in1968 and prefers to sing classical and modern songs.

Jahangirnagar University
Department of Computer Science and Engineering
4th Year 2nd Semester B.Sc. (Hons.) Final Examination 2021

Course No: **CSE 459**
Full Marks: **30**

Course Title: Data Mining
Time: 02 Hrs.

[Answer each of the following questions. Each question carries equal marks. Figures in the right margin indicate marks.]

1. Answer **all** questions:
   a) Define the terms: i) DMQL ii) Fact table. 2
   b) List down the objectives of data warehouse. 2
   c) Describe the architecture of typical data mining system with diagram. 2

2. Answer **Any Two** out of **Three** questions:
   a) Draw and describe briefly a three-tier data warehousing architecture. 3
   b) Illustrate any two OLAP operations. 3
   c) Describe frequent item set generation using the Apriori algorithm. 3

3. Answer **Any Two** out of **Three** questions:
   a) Illustrate association rule with determining support and confidence from a customer sample data set. 3
   b) Consider the simple data set: {2, -3, 5, 67, 80, 1290, -75, 500, 35, 20}. Apply the K-Means algorithm on this data set using the initial centroids 5, -75 and 500. 3
   c) Explain the market basket analysis problem. 3

4. Answer **Any One** out of **Two** questions:
   a) Consider a database which stores data about the customer's behavior of a Computer sales shop. The data set provides training records of some sample class-labelled tuples of the customers of the sales shop. The database contains data about the customer's personal information, profession and income Level. It also stores information about how frequently they come to the shop, e.g., daily, weekly, monthly and payment method, e.g., cash or credit card. 6
   b) Suppose that you are employed as a data mining consultant for an internet search engine company. Describe how data mining can help the company by giving specific examples of how techniques, such as clustering, classification, association rule mining and anomaly detection can be applied. 6

5. Answer **Any One** out of **Two** questions:
   a) Consider the following Banking system. 6
   A local Bank offers various services to its customers including opening of new accounts in each branch by the branch officer. Each account has accNumber, accName, branchName, and balance. The accounts may be Deposit and current account types. Customers can perform various operations, e.g., get balance, credit and debit operations on their accounts at each branch. The

Bank keeps records of the customers personal details and daily transactions on the accounts. Each branch has its name, address, and asset. The Bank manager of each branch can determine the total assets of that branch.

Answer the following questions.

i. Design the dimension tables and a fact table to create a data warehouse schema for the above Banking system with defining their attributes using the Star model.

ii. Draw the Star model for the data warehouse with 3 measures defining the aggregate functions for these measures.

b) Consider a transactional database where 1, 2, 3, 4, 5, 6, 7 are items. 6

ID	Items
t1	1, 2, 3, 5
t2	1, 2, 3, 4, 5
t3	1, 2, 3, 7
t4	1, 3, 6
t5	1, 2, 4, 5, 6

Suppose the minimum support is 60%. Find all frequent item sets. Indicate each candidate set C_k, $k = 1, 2, \ldots$, the candidates that are pruned by each pruning step, and the resulting frequent itemsets L_k.

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Tutorial Examination on CSE 403 (Artificial Intelligence)

Full Marks: 10 Time: 25 minutes

1.	What is an inductive logic? Represent the following using logic symbols: *An interesting teacher keeps me awake. I stay awake in Artificial Intelligence class. Therefore, my Artificial Intelligence teacher is interesting*	5
2.	Define an intelligent agent mentioning its characteristics. How does an agent different from a normal software?	5

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f) List out the knowledge representation techniques that you

2. ***Answer Any Three out of Four.***

a) Clarify rational agent and also illustrate the classification of agents and environments. 4
b) Explain belief, hypothesis and knowledge and meta-knowledge with examples. 4
c) Differentiate between fuzzy and probability citing an example. 4
d) Translate the following knowledge into semantic net and frame. 4
Bird and Fish are animal which is covered by skin. Robin is a bird which is red in color and travels by flying. Hilisha is a fish which is silver in color and travels by swimming.

Answer Any Three out of Four 4

Dept. of CSE, JU

Tutorial Examination on CSE 403 (Artificial Intelligence) # 3

Full Marks: 10 Time: 25 minutes

1.	What is admissible heuristic? Explain an admissible heuristic search.	4
2.	What do you mean my genotype and phenotype? Show a numerical example of mutation? Write down the importance of mutation in GA.	6

Predict the conclusion, [mention the
Lata is older than Tahira.

d) Show a parse tree for the following English sentence:
She was born in Dinajpur in1968 and prefers to sing classical and modern songs.

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4th Year 1st Semester B.Sc. (Hons.) Final Examination -2021

Course Title: Artificial Intelligence
Time: 3 hours

Course No: **CSE-403**
Full Marks: **60**

[Answer each of the following questions. Each question carries equal marks. Figures in the right margin indicate marks.]

1. ***Answer All of the Questions***

a) What is intelligence? Mention at least 3 pioneers of Ai along with their inventions. 2
b) State the old and new visions of AI. 2
c) Define knowledge along with an example. 2
d) Define AI ethics citing a real-life situation where ethics is very important. 2
e) What are the parameters to measure the performance of a rational agent? 2
f) List out the knowledge representation techniques that you have learned in this course. 2

2. ***Answer Any Three out of Four.***

a) Clarify rational agent and also illustrate the classification of agents and environments. 4
b) Explain belief, hypothesis and knowledge and meta-knowledge with examples. 4
c) Differentiate between fuzzy and probability citing an example. 4
d) Translate the following knowledge into semantic net and frame. 4
Bird and Fish are animal which is covered by skin. Robin is a bird which is red in color and travels by flying. Hiisha is a fish which is silver in color and travels by swimming.

3. ***Answer Any Three out of Four***

a) Apply the PROLOG to represent the following expressions. 4
(i) All tigers are ferocious. Royal Bengal is a tiger. So, Royal Bengal is also ferocious.
(ii) Miss X prefers to sing classical and modern songs. She is liked by all Bangladeshis because of her sweet melodies.

b) Apply the adversarial search mechanism to develop the Tic-Tac-Toe game. 4

c) You have given the following premises: 4
i) If x is a parent of y, then x is older than y.
ii) If x is mother of y, then x is a parent of. y
iii) Lata is the mother of Tahira.

Predict the conclusion, [mention the inference rule and laws of proposition correctly]
Lata is older than Tahira.

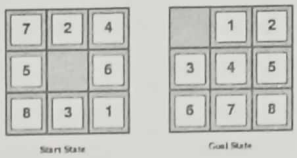
d) Show a parse tree for the following English sentence: 4
She was born in Dinajpur in1968 and prefers to sing classical and modern songs.

Answer Any Three out of Four

4. a) Correlate between (i) Gradient search technique and Hill-Climbing approach, (ii) genotype and phenotype 4

b) Consider a state space where the start state is number 1 and the successor function for state n returns two states, numbers 2n and 2n+1. Now suppose the goal state is 26. List the order in which nodes will be visited and also calculate and compare the cost using (i) BFS technique (ii) iterative deepening technique. 4

c) For following puzzle deduce the (i) total Manhattan distance of the tiles from their goal positions, (ii) true cost using A* search. 4



d) i) Identify the requirement of fuzzy logic in knowledge representation and expert system. 4
ii) Outline the criteria for choosing forward and backward chaining in an expert system.

Answer Any Two out of Three

5. a) Suppose we have a graph with nodes S, A, B, C, D, E, F and G, where S is the start and G the goal node. The distances between connected nodes and heuristic values are assigned with the graph. 6

Explain A* search strategies to indicate the goal state is reached and list, in order, all the states popped off of the OPEN list from the following Fig.1.

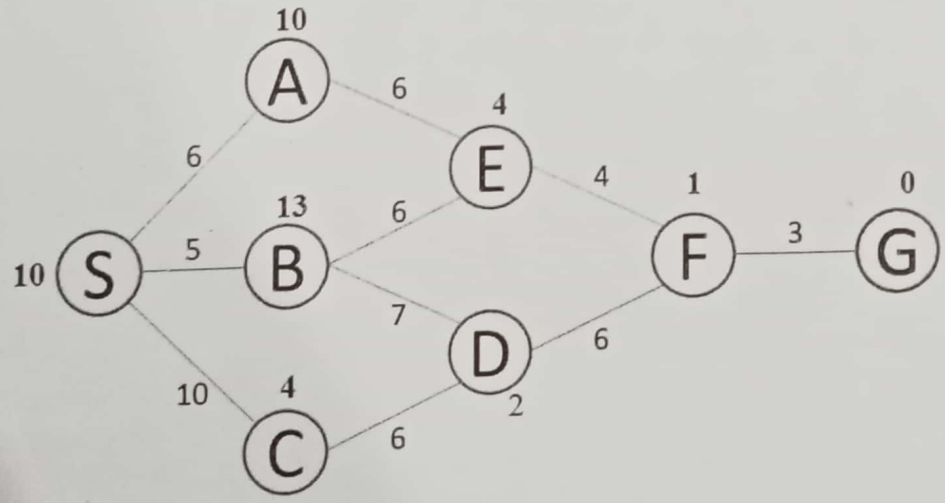


Fig.1