Roll No: 106121019

Cycle Test 1 – Semester IV
CSPE41 – Software Engineering

Date & Time: 13 April 2023, 9.30 am – 10.30 am Faculty: C. Oswald || Max. Marks: 20
Batch: 2021 CSE

Note: Read the questions carefully. Your *logic* is more important than the answer.
Present your content as per the marks given.

0. Name the author of the text book "Software Engineering: A Practitioner's Approach", we refer to. (0 mark)

1. 'The Shipping Saints' (TSS) prides itself on having up-to-date information on the processing and current location of each shipped item. To do this, TSS relies on a company-wide information system. Shipped items are the heart of the TSS product tracking information system. Shipped items can be characterized by item number (unique), weight, dimensions, insurance amount, destination, and final delivery date. Shipped items are received into the TSS system at a single retail center. Retail centers are characterized by their type, uniqueID, and address. Shipped items make their way to their destination via one or more standard TSS transportation events (i.e., flights, truck deliveries). These transportation events are characterized by a unique scheduleNumber, a type (e.g, flight, truck), and a deliveryRoute.

   Create an Entity Relationship diagram that captures this information about the TSS system. Be certain to indicate identifiers and cardinality constraints. (3 marks)

2. Select the best answer/s for a to e: (3 marks)
   a. Which of the following characteristics should not be used to assess the quality of a WebApp?
      i) aesthetics ii) reliability iii) maintainability iv) Usability
   b. A software organization has been assessed at SEI CMM Level 4. Which of the following does the organization need to practice beside Process Change Management and Technology Change Management in order to achieve Level 5.
      i) Defect Detection ii) Defect Prevention iii) Defect Isolation iv) Defect Propagation
   c. The goal of structured programming is to:
      i) have well indented programs ii) be able to infer the flow of control from the compiled code
      iii) be able to infer the flow of control from the program text iv) avoid the use of GOTO statements
   d. Which one of the following assertions concerning code inspection and code walk-through is true?
      i) Code inspection is carried out once the code has been unit tested
      ii) Code inspection and code walkthrough are synonyms
      iii) Adherence to coding standards is checked during code inspection
      iv) Code walkthrough is usually carried out by an independent test team
   e. If there are 3 boolean variables in a code, how many possible states are there?
      i) 3 ii) 7 iii) 2 iv) 8
   f. Expand the following abbreviations. (1 point)
      KDSI, SSFD, DRE, CRe

3. What is the most aesthetically pleasing website you have ever visited and why? Mention at least 2 reasons supporting to the concepts taught in the student's seminar. (1.5 points)
   Please don't mention any website developed internally within NITT. I should be sufficiently convinced by going through the website you mention.

4. Answer the following answers.
   a. Flag variables are used to communicate processing conditions from one routine to another. Now, consider the following code snippet given. With respect to the use of flags, identify the bad practice used in this code and rewrite the same with good practice. Justify your answer. (2 points)

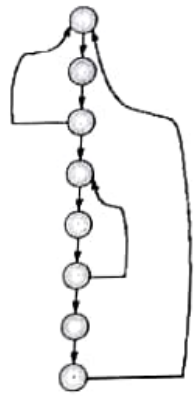
```
big_number_flag = False
for i in range(5):
        n = int (input("Enter a number"))
        if n > 1000:
                big_number_flag = True
        else:
                big_number_flag = False
# after the loop
if big_number_flag:
        print("saw at least one big number")
else:
        print("didn't see any big numbers")
```

b. Consider three software items given below: Calculate values of McCabe's Cyclomatic complexity of Program-X, Program-Y and Program-Z respectively. (2 points)

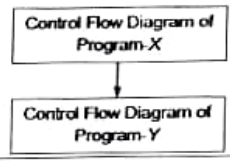
Program-X:

```
sumcal (int maxint, int value)
{
    int restult=0, i=0;
    if (value <0)
    {
       value = -value;
    }
    while ( (i < value) AND (result
< = maxint) )
    {
       i = i + 1;
    result = result + 1;
    }
    if (result <= maxint)
    {
       print f (result) ;
    }
    else
    {
       print f("large");
    print f ("end of program"); }
}
```

Control Flow Diagram of Program-Y:



Control Flow Diagram of Program-Z:



c. Consider the code given below and calculate the Effort E required to write the program. (4 points)

```
int f=1, n=8;
for (int i=1; i<=n; i+=1)
f*=i;
```

d. Read through the following scenario.

"Omega Software Inc." is a medium-sized software house specializing in telecom realtime software, employing about 180 professionals. As no executive volunteered for the position of "executive in charge of software quality", the general manager of Omega Software did not insist on nominating an executive to this position. Moreover, he did not assign any great importance to issuing a quality policy document because, as he claimed, "the company is anyway committed to quality"; hence, there was no need for any written document. This situation continued for about two years without any critical failure.

(a) Suggest what unnoticed and undesired events may have resulted from this position. Explain in not more than 6 lines. (1 point)

(b) Suggest what an executive in charge of software quality, in addition to an adequate and updated policy document, could contribute to company's product quality. Explain in not more than 10 lines. (1 point)

e. Vortex's generous sponsor Boeing would like to develop a software to control runway movements in the airport for which the details are given below.

Requirement R: "Reverse thrust shall only be enabled when the aircraft is moving on the runway Domain **Properties D**: Wheel pulses on if and only if wheels turning, Wheels turning if and only if moving on runway

Specification S: Reverse thrust enabled if and only if wheel pulses on

Develop two questions each for Verification and Validation to ensure quality checks based on the above information. (2 points)

END