UNITED INTERNATIONAL UNIVERSITY (UIU)

Dept. of Computer Science & Engineering

Trimester: Spring 2024

Course No: CSE 4495 Title: Software Quality Assurance and Testing

Section: A

Time: 35 minutes **Marks: 20**

Name		**ID**	

1. You manage an online resource sharing platform where people can share e-books and others study materials. A typical upload/download takes ten minutes on average, and an interrupted upload/download must be restarted from the beginning. The number of customers engaged in a activity at any given time ranges from about 960-1200 during peak hours. On average, your system goes down (dropping all connections) about three times per week, for an average of four minutes each time. You are given the following two options to improve the availability of your system(so that less customers face interruption when they are using your services). [3]
   i. Reducing total downtime to half (two minutes to restart on average after each crash, but number of crashes remain unchanged).
   ii. Increasing the current MTBF by 50% (i.e. two system outage per week, but total downtime remains unchanged).

   Analyze both possibilities to prove statistically which method alleviates more users and decide which option better achieves your goal. **[8]**

   Ans: Evaluating only downtime will not suffice here as crashes also affect users (as average download time is 10 mins, any user who started downloading from 0-10 mins. before the crash will likely have their download interrupted due to the crash). So we must evaluate which choice affects how many users. We should note that, the avg traffic in the system is 900-1200 requests/hours = **16-20 reqs/min**

   Choice1: We reduce 6 minutes of downtime. Hence all the traffic requesting services within that window can now be served by the system, So, we can serve an additional 6*(16-20) requests = 96 - 120 requests.

   Choice2: We do not reduce any downtime. So apparently it might seem availability is not increased. But as mentioned earlier reducing 1 crash will save 10 mins worth of requests from being interrupted which affects approximately 10 *(16-20) = 160-200 users.

   Hence Choice 2 is the better option

2. What are the properties of 'Dependability' and what is the relationship between them?
   Consider the following statements- [3+3=6]
   i. A system can be correct yet unsafe.
   ii. A system can be safe but not robust.
   iii. A user needs to download a very large file over a slow modem, then he/she should be more concerned about the system 'availability' rather than the 'Mean time between failures(MTBF)'
   Now either support or oppose each of these statements and explain the logical reasoning behind your stand.

   Ans:
   1. Correctness
   2. Reliability

3. Safety
4. Robustness.

The statements are-

I. True, a system can be functionally correct yet fall into catastrophical hazards. For instance, a software maybe behaviorally okay but after a data wipe/hardware failure there might not be any backup process to restore it to the previous state. This is usually a sign of weak requirement engineering.

II. True, a system can be safe in terms of avoiding hazards but still have annoying bugs or failures in unexpected situations which makes it un-robust.

III. False, when maintaining long user sessions is the highest priority MTBF takes importance over availability.

3. You are testing a high level API named Geolocation which receives the name of a city/location and responds with the Latitude and Longitude of the said location? Here you are looking to test two things- [6]

   i. Whether the API returns correct coordinates.

   ii. Does the API meet response time requirements(responds within 200ms)?

   What are the types of oracles you need to use when you write test cases for this API.

Ans:

I. To check if the API returned correct co-ordinates for a given location we need an **Expected value Oracle.**

II. To check if the process meets timing requirements we need **Implicit oracle**.