**Corporate Service Division/ Enterprise Solution Section**

**Written Assessment for**

**Senior-Full Stack Developer, UNEP**

**Instructions**

This a hands-on exam to test your development skills in the technologies required for this position. You are expected to follow the steps below to deliver the required solution in a working status. You must ensure that the functionalities delivered work even if you don’t complete all the functionalities given the time limitation.

Time limit: Three hours and twenty minutes (3hrs 20 Min)

Good luck with your implementation!

***Section 1: Multiple Choice Questions (30 Marks, 20 Minutes)***

1. Which resources are typically provided by an Infrastructure as a Service cloud computing delivery model?

A. applications

**B. virtual machines**

**C. virtual private networks**

D. middleware software stacks

2. Which delivery model is an example of a cloud computing environment that provides users with a web based email service?

**A. Software as a Service**

B. Platform as a Service

C. Computing as a Service

D. Infrastructure as a Service

3. What is one benefit of cloud computing?

**A. Computer resources can be quickly provisioned.**

B. A workload can quickly move to a cloud computing environment.

C. There is no operational cost for a cloud computing environment.

D. The resources can quickly move from one cloud environment to another.

4. Which statement best describes the relationship between application, server, and client in a multitenancy environment?

A. Single instance of software running on a server and serves one client.

B. Single instance of software running on a server and serves multiple clients.

**C. Multiple instances of software running on a server and serves multiple clients.**

D. Multiple instances of software running on multiple servers and serves one client.

5. ------- is a property that describes various characteristics of an entity  
A.ER Diagram  
B.Column  
C.Relationship  
**D.Attribute**

.6. -------- level describes what data is stored in the database and the relationships among the data  
A.Physical Level  
B.Logical Level  
C.Conceptual Level  
**D.None of the above**

7. -------------  stores metadata about the structure of the data base  
A.Physical data base  
B.Query Analyzer  
C.Data Dictionary  
**D.Data Catalog**

.8. In   Relational database  Data is stored as record types and the  relationship is represented by set types  
A.True  
**B.False**

9. Logical database design describes describes base relations, file organizations, and indexes that are used to achieve efficient access to   data.  
**A.True**  
B.False

10. Which of the following is not a DDL command?  
**a) UPDATE**  
b) TRUNCATE  
c) ALTER  
d) None of the Mentioned

11. With SQL, how do you select all the records from a table named “Persons” where the value of the column “FirstName” ends with an “a” ?  
a) SELECT \* FROM Persons WHERE FirstName=’a’  
b) SELECT \* FROM Persons WHERE FirstName LIKE ‘a%’  
**c) SELECT \* FROM Persons WHERE FirstName LIKE ‘%a’**  
d) SELECT \* FROM Persons WHERE FirstName=’%a%’

12. A Development Team is self-organized and empowered. It is also the authority on deciding what business needs are required to be developed.

-True

**- False**

13. Which of the following key component of DevOps?

1. Continuous Delivery

2. Continuous Testing

3. Continuous Integration

**4. All of the above**

14. How does DevOps impact security of an application or machine?

1. Security is increased because of the automation process

2. Security is increased by including it earlier in the process

3. Security is reduced because of the automation process

**4. Both 1 & 2**

15. What is an SQL injection attack?

A. An attack that floods a website with traffic to make it unavailable.

B. An attack that takes advantage of a vulnerability in a system to gain unauthorized access.

**C. An attack that injects malicious SQL code into a web application to extract sensitive information or modify the database.**

D. An attack that uses social engineering to trick users into revealing sensitive information.

16. What is the use of Git?

**1. Version Control System tool**

2. Continuous Integration tool

3. Containerization tool

4. Continuous Monitoring tool

17. Which of the following is not a part of Develops life cycle \_\_\_\_\_\_

1. Code

2. Plan

3. Build

**4. Operating**

18. Which of the following is not a feature of continuous delivery ?

**1. Automate Everything**

2. Continuous Improvement

3. Bug fixes and experiments

4. Gathering Requirement

19. What do you mean by trunk in trunk based DevOps delivery?

1. Trunk is the process of merging code in DevOps deliveries.

**2. Developers collaborate on code in a single branch called “trunk”.**

3. Trunk is a special private branch in a developer workstation.

4. None of these

20. What is the purpose of two-factor authentication (2FA)?

A. To require two passwords for access to a system.

B. To require a password and a security question for access to a system.

C. To require a password and a fingerprint scan for access to a system.

**D. To require two forms of authentication for access to a system.**

***Section 2: Practical Test (70 Marks,3 hrs )***

Q1 (30 Marks). **UNEP plans to build an online portal to store and manage staff technical skills. The system should help streamline rostering staff, managing their profiles, and reporting on them.**

**As a System Developer, you are responsible for mapping user requirements, provide detailed explanations for each step in your requirement-gathering plan, techniques used, and deciding factors on the technology to be used.**

* Outline a comprehensive requirement gathering plan for the new skills portal. Your plan should include: ( 5 pts each)
  + What stakeholders would you be involved with and why?

**Departments, Staff, Leadership, IT(development team)**

* + The methodologies you would use to gather requirements

**Questionaires, interviews, Observation**

* + A timeline of activities from initiation to completion.

|  |  |  |
| --- | --- | --- |
| **Initialization** | **1 Week** | **Get the requirement from entity** |
| **Requirement Gathering** | **1 Week** | **Engage Stakeholders** |
| **Conceptualization** | **1 Week** | **Brainstorm the flow** |
| **Design** | **2 Week** | **Come up with development flow** |
| **Develop** | **2 Week** | **Create app based on design** |
| **Test** | **1 Week** | **Test unit/functions as per system design and requirement** |
| **Deploy** | **3 Days** | **Put to production once test complete** |

* + Provide a drawing of possible functional diagram and use case diagram

**Actors are Staff, managers and departments**

Admin/Managers

Users

* + ..Any techniques you would use to document and prioritize the requirements.

**Observation**

* + What are the criteria you would use to choose the development language.

**Users attributes in term of technological gadgets they own,Security, Scalability, Existing IT infrastructure(Technologies currently in use) at UNEP, System requirements in terms of integrations, Partners**

* You may create your own assumptions related to this process

Q2 (40 Marks ). **For the same portal, you must build the solution using any of the following front end and backed languages : Asp.net, Java , PHP, Java Script frontend frameworks, C#, and SQL Server, MySQL , PostgreSQL , and MariaDB .**

**Instructions:**

* **Submit your application's source code on a Git Repository (GitHub repository link preferred) and share Git link on the exam platform. (Pass/Fail)**
* **Include a README file with instructions on how to set up and run the application locally in your Git submission. ( 5 Pts)**
* **Your database should be extracted into SQL format and submitted with your source code on Git. ( 5 Pts)**
* **Provide credentials to login to the application**
* **Staff Pages ( 20Pts)**

Create a form for staff to input their personal information with the following fields:

* + IndexNumber (string)
  + FullNames (string)
  + Email (string)
  + CurrentLocation (string)
  + HighestLevelOfEducation (dropdown)
  + DutyStation (dropdown)
  + AvailabilityForRemoteWork (bool)
  + Software Expertise (dropdown)
  + Software Expertise Level (dropdown)
  + Language (dropdown)
  + Level of Responsibility (dropdown)
* **Staff Listing and Information page (10Pts)**
  + List of all staff displaying IndexNumber , FullNames , Email, CurrentLocation , HighestLevelOfEducation, DutyStation
  + This page should have the option to Add/Edit/Delete the record

**Bonus Points ( 5 Pts Extra)**

* + Models with management/admin pages for Staff, Education Levels, Duty Stations, Projects, Software Expertise, and Languages.
  + Screenshots: Visual evidence of the application in action, covering: Login and logout process, Adding and viewing staff personal information, searching for staff based on criteria in the admin pages.