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**WORLD SKILLS SINGAPORE 2020**

**FINALS**

**IT SOFTWARE SOLUTIONS FOR BUSINESS**

**DAY 2, SESSION 1**

**4 HOURS**

**FRIDAY 02 OCT 2020**

**INSTRUCTIONS**

1. **You are required to answer ALL the questions.**
2. **Do not open this question paper until you are told to do so.**
3. **Write your NRIC Number and Work Station Number clearly at the top right-hand corner on the front page of this question paper.**
4. **Return this question paper at the end of the test.**
5. **Please read all instructions before you begin.**
6. **Background**

The ASEAN Skills Competition (ASC) is the biggest vocational education skills excellence event in the ASEAN (The Association of Southeast Asian Nations) region that truly reflects global industry. For the first time, Singapore will be hosting the 13th WorldSkills ASEAN Competition in July 2020. The competition will see close to 300 top youth talents from the 10 ASEAN member countries competing in 22 skills areas.

To facilitate the dissemination of announcements and competitor registration, the organizers have decided to experiment incorporating a mobile solution during ASC 2020. Your IT solution company has been engaged to build this hospitality mobile solution (ASC Hospitality Mobile Solution). This solution should consist of 3 systems: Competitor Mobile App, Administrator Mobile App, and a simple webservice to power the 2 mobile apps.

1. **ASC Hospitality Mobile Solution**

The following 3 describe the high-level functionalities of the individual systems.

* 1. Competitor Mobile App

The competitor mobile app is used by competitors mainly for the duration of the competition. Here is the list of use cases that should be implemented:

* Login
* Logout
* View Profile
* Retrieve list of announcements
* Retrieve competitor’s QR code

Each competitor should be given an account which they can use to log into the mobile app. The app basically has 2 main functions:

1. It allows the competitors to view announcements posted by the organizers.
2. It allows the competitors to retrieve their QR code where the administrators can then use to check in the competitors by scanning or entering the QR code.
   1. Administrator Mobile App

The administrator mobile app is used by the organizers to send announcements and to capture competitor registration. Here is the list of use cases that should be implemented:

* Add competitors
* Send announcements
* Scan or enter competitor’s QR code for registration

Administrator will have a scan QR code function which can be used to check in the competitors, as well as adding competitors and sending announcements.

* 1. Simple Webservice

The simple webservice is used to power the functionalities of the competitor mobile app and administrator mobile app. The design of this webservice should follow a RESTful API approach. You should ensure that there is proper authentication mechanism for each API call (i.e. only authenticated users are allowed to make an API call). *Hint: you can consider using access token design to ensure that the calls are authenticated.*

1. **Applications Specifications**

The specifications below are following the Cucumber specifications are can be used as a starting point for behaviour driven development. Today’s systems landscape is becoming increasingly complex and distributed, and unambiguous human readable functional specifications help describing what’s needs to be built. These specifications can be used as the basis for app development, by allocating each scenario step to a unit test. The resulting code coverage not only helps guarantee the system , but does insure that what is developed matches the ask.

Cucumber syntax:

Feature: a set of scenarios grouped around a feature

Scenario: a set of steps representing a use case

Step: a reusable assertion

Given: Prerequisite assertion

When: Action

Then: Action result assertion

And: Repeats previous keyword

example: When I do this

And I do that

Is same as

When I do this

When I do this

Angle Brackets <text> stands for test variables

1. **COMPETITOR MOBILE APP**
   1. Feature: Login
2. Scenario: Navigate to Login Page

When I launch the Competitor app

And I am an unauthenticated user

Then I am on the ‘Login’ Page

And I see an ‘email’ entry

And I see a ‘password’ entry

And I see a ‘Login’ button

And I cannot see a Tab Bar

1. Scenario: Login Success

Given I am an unauthenticated user

And I am on the ‘Login’ Page

When I enter ‘<validEmail>’ in the ‘email’ entry

And I enter ‘<validPassword>’ in the ‘password’ entry

And I tap the ‘Login’ button

Then I am redirected to the ‘Home’ Page

And I am on the ‘Announcements’ Tab

And I see a TabBar with 2 Tabs

And I see a selected Tab ‘Announcements’

And I see a Tab ‘Profile’

1. Scenario: Login Failure

Given I am an unauthenticated user

And I am on the ‘Login’ Page

When I enter an email ‘<invalidEmail>’ in the ‘email’ entry

And I enter a password ‘<invalidPassword>’ in the ‘password’ entry

And I tap the ‘Login’ button

Then I see an alert with the message ‘Invalid Login Details’ and a button with the text ‘OK’

When I tap the ‘OK’ button

Then the alert is dismissed

And I see the ‘email’ entry is empty

And I see the ‘password entry is empty

* 1. Feature: ‘Announcements’ Tab

1. Scenario: Navigate to ‘Announcements’ Tab

Given I am an authenticated user

When I tap the ‘Announcements’ Tab

Then I see an Announcement List

And I see <announcementAmount> Announcement Items

And I see the first announcement has an label annoucementDate with text ‘<annoucementDate>’ , a label announcementTitle with text ‘announcementTitle’

* 1. Feature: ‘Profile’ Tab

1. Scenario: Navigate to ‘Profile’ Tab

Given I am an authenticated user

When I tap the ‘Profile’ Tab

Then I see ‘<fullname>’ in the ‘name’ label

And I see a qrcode ‘<code1Image>’ in the ‘qrcode’ imageview

And I see a code ‘<code1>’ in the ‘code’ label

And I can see a ‘logout’ button

When I wait for 30 seconds

Then I see a qrcode ‘<code2Image>’ in the ‘qrcode’ imageview

And I see a code ‘<code2>’ in the ‘code’ label

1. Scenario: Logout Success

Given I am an authenticated user

And I am on the ‘Profile’ Tab

When I tap the Logout Button

Then I am an unauthenticated user

And I am on the ‘Login’ Page

1. **ADMINISTRATOR MOBILE APP**
   1. Feature: ‘Scan Competitor’ Tab
2. Scenario: Navigate to ‘Scan Competitor’ Tab

Given I launch the Administrator App

Then I am on the ‘Home’ Page

And I see a TabBar with 3 Tabs

And I see a selected Tab ‘Scan Competitor’

And I see a Tab ‘Add Competitor’

And I see a Tab ‘Announcements’

And I see a QR code scanner

And I see a ‘code’ entry to be used when the QR scanner is not available

1. Scenario: Scan Valid Not Checked-In Competitor Code

Given I am on the ‘Competitor’ Tab

When I scan or enter a code ‘<validNotCheckedInCode>’ from the competitor app ‘Profile’ tab

Then I see an alert with the text ‘<competitorEmail> successfully checked in’ and a button with the text ‘OK’

And I can see an alert ‘Checked in’ and a button with the text ‘OK’ on the competitor app

When I tap the ‘OK’ Button

Then the alert is dismissed

1. Scenario: Scan Valid Checked In Competitor Code

Given I am on the ‘Competitor’ Tab

When I scan or enter a code ‘<validCheckedInCode>’ from the competitor app Me tab

Then I see an alert with the text ‘<competitor Email> already checked in’ and a button with the text ‘OK’

And I can see an alert ‘Already Checked in’ and a button with the text ‘OK’ on the competitor app

When I tap the ‘OK’ Button

Then the alert is dismissed

1. Scenario: Scan Invalid Competitor Code

Given I am on the ‘Competitor’ Tab

When I scan or enter a code ‘<invalidCode>’ from the competitor app Me tab

Then I see an alert with the text ‘Invalid Code‘ and a button with the text ‘OK’

When I tap the ‘OK’ Button

Then the alert is dismissed

1. Scenario: Scan Expired Competitor Code

Given I am on the competitor app

And I am an authenticated user

When I tap the ‘Profile’ Tab

Then I see a code ‘<code1>’ in the ‘code’ label

And I wait for 30 seconds

Then I see a code ‘<code2>’ in the ‘code’ label

Given I am on the administrator app

And I am on the ‘Competitor’ Tab

When I scan or enter a code ‘<code1>’

Then I see an alert with the text ‘Expired Code‘ and a button with the text ‘OK’

When I tap the ‘OK’ Button

Then the alert is dismissed

* 1. Feature: ‘Announcements’ Tab

1. Scenario: Navigate to ‘Announcements’ Tab

Given I am on the ‘Announcements’ Tab

Then I see a ‘Title’ entry

And I see a ‘Send Announcement’ button

1. Scenario: Send Announcement

Given I am on the ‘Announcements’ Tab

And I enter ‘<announcementTitle>’ in the ‘Title entry

And I tap the ‘Send Announcement’ button

Then I see an alert with the text ‘Announcement sent‘ and a button with the text ‘OK’

When I tap the ‘OK’ Button

Then the alert is dismissed

When I Launch the Competitor App

And I am an Authenticated User

And I am on the ‘Announcements’ Tab

Then I see an Announcement List

And I see the first announcement has an label annoucementDate with text ‘<annoucementDate>’ , a label announcementTitle with text ‘announcementTitle’

* 1. Feature: ‘Add Competitor’ Tab

1. Scenario: Navigate to ‘Add Competitor’ Tab

Given I am on the ‘Add Competitor’ Tab

Then I see a ‘Full Name’ entry

Then I see a ‘Email’ entry

Then I see a ‘Password’ entry

And I see a ‘Add Competitor’ button

1. Scenario: Add Competitor

Given I am on the ‘Add Competitor’ Tab

And I enter ‘<fullName>’ in the ‘Full Name’ entry

And I enter ‘<email>’ in the ‘Email’ entry

And I enter ‘<password>’ in the ‘Password’ entry

And I tap the ‘Add Competitor’ button

Then I see an alert with the text ‘Competitor <fullName> created‘ and a button with the text ‘OK’

When I tap the ‘OK’ Button

Then the alert is dismissed

Then => Login Success with <email> and <password>

1. API
   1. AUTHENTICATION SERVICE
2. Log In

You may want to use openId and use auth token / refresh token

Or any other solution that works

1. Get Competitor

Payload: competitorId (Guid)

Response: competitor(competitor)

1. Add Competitor

Payload: email(string), password(string), fullName (string)

Response: success(bool)

* 1. ANNOUNCEMENT SERVICE

1. Add Announcement

Payload: description(string)

Response: success(bool)

1. Get Announcements

Payload: null

Response: announcements (List<Announcement>)

* 1. COMPETITOR SERVICE

1. Get Live Code ( Expires every 30 sec)

Payload: userId(Guid)

Response: qrCode (string)

1. Scan Competitor Live Code
2. Payload: code(string)
3. Response: status (Status)
4. **Instruction to Competitors**

Section 2 has described in briefly how the should operate, and now you will need to implement this system. Please read the following instructions carefully; non-compliance with these instructions will result in you losing marks.

* 1. **TASK 1:** Wireframing

Objective:

Before a mobile app is developed, it is often a good idea to create a simple wireframe to guide the developer in developing the app.

Specific Instructions:

Using any wireframing/mock up tools or draw on paper for how the 2 mobile apps will look like. You should provide the wireframe for every screen and describe how the navigation within the app will be like. You will be asked to present your wireframe and describe the flow of the app.

* 1. **TASK 2**: RESTful API Design

Objective:

A systematic API design allows backend and frontend developers to work well each other. Have an API specification will allow backend and frontend developers to work independently from each other.

Specific Instructions:

Using a Microsoft office or any text editor, describe all the necessary endpoints and their details (e.g. the URL, HTTP verb, return data (if any), possible http statuses (e.g. 200, 404, 500, etc)). As describe in section 2.3, you should also have an authentication mechanism in place to ensure that all the API calls are properly authenticated.

* 1. **TASK 3**: System Implementation

Objective:

To build the 3 systems (competitor mobile app, administrator mobile app, and simple webservice)

Specific Instructions:

Implement the solution and demonstrate the functionalities of the system. You should decide on the fields captured in the system and API (e.g. user profile information).

* 1. **Grading**

You will be assessed not just on the correctness of the application but also on the following:

* UI of the apps (it should at least be professional looking)
* UX of the apps (there should be proper visual feedback and should be intuitive)
* Architectural design (the solution should be generic and systematic enough to cater for future expansion of features)
* Working prototypes

**-END OF PAPER-**