



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.

1. 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 the 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 with 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.

2. ASC Hospitality Mobile Solution

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

2.1 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 Profile¹
- Retrieve the list of announcements

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

1. It allows the competitors to view announcements posted by the organizers.
2. It allows the competitors to retrieve their unique competitor ID² where the administrators can then use to check in the competitors³.

2.2 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
- Check-in competitor's ID (or scan QR code)

Administrators will check in the competitors, as well as adding competitors and sending announcements.

2.3 Simple Webservice

The simple webservice is used to power the functionalities of the competitor mobile app and administrator mobile app. You should ensure that there is a 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 The competitor ID is presented together with the profile information.

² Alternatively, you could also generate a unique QR code.

³ In order to check in a competitor, the administrators will either enter the competitor ID or scan the QR code. You can assume that the administrator would need to check in the competitors once at the beginning of the competition.

3. Applications Specifications

The specifications below are following the Cucumber specifications and can be used as a starting point for behavior-driven development. Today's systems landscape is becoming increasingly complex and distributed, and unambiguous human-readable functional specifications help to describe what that 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 ensure that what is developed matches the requirements.

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

3.1 Competitor Mobile App

3.1.1 Feature: Login

i) 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
```

ii) 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'
```

iii) 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

3.1.2 Feature: 'Announcements' Tab

i) 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 a label announcementDate with text '<announcementDate>', a label announcementTitle with text 'announcementTitle'

3.1.3 Feature: 'Profile' Tab

i) 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 '<codeImage>' in the 'qrcode' imageview
And I see a code '<code1>' in the 'code' label
And I can see a 'logout' button

ii) Scenario: Logout Success

Given I am an authenticated user
And I am on the 'Profile' Tab
Then I am an unauthenticated user
And I am on the 'Login' Page

3.2 Administrator Mobile App

3.2.1 Feature: 'Check-In Competitor' Tab

i) Scenario: Navigate to 'Check-In 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 'Check-In 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

ii) Scenario: Enter Valid Not Checked-In Competitor Code

Given I am on the 'Check-In 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

iii) Scenario: Enter Valid Checked-In Competitor Code

Given I am on the 'Check-In 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

iv) Scenario: Enter Invalid Competitor Code

Given I am on the 'Check-In 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

3.2.2 Feature: 'Announcements' Tab

i) 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

ii) 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 a label announcementDate with text '<announcementDate>', a label announcementTitle with text 'announcementTitle'

3.2.3 Feature: 'Add Competitor' Tab

i) Scenario: Navigate to 'Add Competitor' Tab

Given I am on the 'Add Competitor' Tab
Then I see a 'Full Name' entry
Then I see an 'Email' entry
Then I see a 'Password' entry
And I see an 'Add Competitor' button

ii) 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> create' 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>

3.3 Simple Webservice (API)

1.1 AUTHENTICATION SERVICE

- i) Log In
*You may want to use openId and use auth token / refresh token
Or any other solution that works*

1.2 ANNOUNCEMENT SERVICE

- i) Add Announcement
Payload: description (string)
Response: success (bool)
- ii) Get Announcements
Payload: null
Response: announcements (List<Announcement>)

1.3 COMPETITOR SERVICE

- i) Enter Competitor ID
Payload: competitorId (string)
Response: status (Status)
- ii) Get Competitor
Payload: competitorId (Guid)
Response: competitor (competitor)
- iii) Add Competitor
Payload: email (string), password(string), fullName (string)
Response: success (bool)

4. Instruction to Competitors

Section 2 described briefly how the system 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.

4.1 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/mockup 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.

4.2 **TASK 2:** API Design

Objective:

A systematic API design allows backend and frontend developers to work well with 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 described in section 2.3, you should also have an authentication mechanism in place to ensure that all the API calls are properly authenticated.

4.3 **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).

4.4 **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