University of Technology, Jamaica

School of Computing and Information Technology

Advanced Programming

CIT3009

Course Outline

Academic Year 2018/9 SEM 2

Module Overview:

Advanced Programming offers enterprise level programming concepts using modern technologies, frameworks, techniques and widely used industrial third party tools. At the end of the module, students will be able to build scalable, distributed, robust, multi-threaded, multi-user GUI applications and services using technologies covered in the module.

Syllabus: https://drive.google.com/open?id=1jj19L3OsvV3rBYtiAR1sUe-Vric4k0kT

Course Content:

Google Drive:

Direct Link:
https://drive.google.com/drive/u/1/folders/0BymQnRg6tuQ4SHVJWVkzME94bUU

- Includes, lectures, labs, tutorials, past course material and other samples

Facilitators:

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***Preferred for student enquiries

**Consultation times will be provided by lecturers when available. Consultation by appointment only: https://goo.gl/dGGzfT

Selected Tools/Technologies/Resources to be incorporated:

- Primary Programming Language: Java
- Eclipse (latest)- http://eclipse.org/downloads
- Java Runtime Environment And Java Development Kit, min version 1.7 - http://www.oracle.com/technetwork/java/javase/downloads/index.html or http://www.oracle.com/technetwork/java/javase/downloads/index.html
- Additional resources will be provided where necessary
- Git (latest) - https://git-scm.com
- Sourcetree (optional) - https://www.sourcetreeapp.com/
- Github Desktop (optional) - https://desktop.github.com/

- Maven - https://maven.apache.org/
- Gitlab - http://gitlab.com/

Required Text and Recommended Readings:

Required:

Sierra, K., & Bates, B. (2008). Head First Java (2nd ed.). Sebastopol: O'Reilly Media, Inc.

Stellman, A., & Greene, J. (2013). Head first C#. Sebastopol, CA: O'Reilly.

Recommended:

Duvall, P., Matyas, S., & Glover, A. (2013). Continuous integration. Upper Saddle River, NJ [u.a.]: Addison-Wesley.

Kikas, R., Gousios, G., Dumas, M., & Pfahl, D. (2017). Structure and Evolution of Package Dependency Networks. In Mining Software Repositories (MSR), 2017 IEEE/ACM 14th International Conference. Buenos Aires, Argentina: IEEE. Retrieved from http://ieeexplore.ieee.org/document/7962360/

McBurney, P.W., & McMillan, C. (2014). Automatic documentation generation via source code summarization of method context. ICPC.

Documentation for third party tools provided by the vendors of the tools

Head-First Object-Oriented Analysis and Design

Platform Library Support and Documentation.

Assessment Breakdown:

Theory Test	10%
Research Project Prototype and Interview	25%
Research Project Presentation	5%
Group Project	20%
Final Examination	40%

Exam (40%)

Duration : 2 hours

Exam Format:

5 Sections to Choose 3 from

- Abstract Types and Generics
- Object Serialization and Exception Handling
- Abstraction and Design Patterns
- Continuous Integration
- Database Connectivity

All scenario type questions based on a background

Research Project (25% + 5%)

Each student in a group of no more than two (2) persons will be tasked to choose ANY language to complete the following objectives:

- Demonstrate the use of SOLID principles
- Demonstrate the use of the Repository Pattern
- Demonstrate the use of the Model-View-Controller Pattern
- Demonstrate the use of the Singleton Pattern
- Demonstrate the use of the Factory Pattern
- Demonstrate the use of a Code Generation Tool
- Demonstrate the use of Source Control Management Tool
- Demonstrate the use of a Package Management Tool
- Demonstrate Unit Testing and Test Automation
- Continuous Integration using a Continuous Integration Server

The project may be a web, mobile or desktop application. Feel free to utilize existing frameworks and develop portfolio ready projects

The School of Computing and Information Technology has been engaged in the past few weeks to provide interns or future employees with skills and disciplines in the following areas.

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- Angular JS,
- React JS
- Backbone
- SparkJava
- SpringBoot
- Laravel
- ASP.NET
- Express.Js

If you are interesting in preparing or aligning for such opportunities, you may consider choosing one of the above tools. NB, these are optional.

Scenario:

John as you may know, owns a shop on campus. John would like some assistance developing an app that allows students from across the campus to request snacks to be delivered to their current location. John hopes to have a rider who will deliver the snacks around campus and collect cash from the students on his behalf. Students should be able to view a list of available snacks (name, price, image) and make a request of one or more snacks. The request for snacks should include their current location on campus, their name and student id. John or the delivery man should be

able to view a list of orders. While any student should be able to make a request, John or the delivery man should have to log in to view existing orders.

Research Project Deliverables:

- Git Repository (A private repository is recommended until you are ready to make your project public) with the following folders containing all deliverables
    - src - this folder should contain the project code
    - build - this folder should contain the final software artefact(s)
    - Design - this folder will store any design documents generated automatically from the project using a code generation tool
        - ERD Diagram
        - Class Diagram
        - APA formatted project report
- Youtube Video :
    - Explaining how each concept was incorporated in the project
    - Provides a working demo of the application
    - Demonstrate how to run/start the application
- APA formatted project report
    - Defines and details how each software pattern was incorporated in the project
    - Defines and details
    - Citations and references should be included
- Presentation
    - To class (more details to follow)
- Interview

Group Project (20%) – More Satisfied Customers for Right Now Taxi Service

Right Now Taxi Service main office has been overwhelmed with calls for cabs, locations and rather impatient customers. They would like some assistance to handle these numerous requests.

You have been asked to develop a prototype for the Right Now Taxi Service. The manager is interested in your proposal to have AI agents handle frequent customer queries.

Your team has been asked to create a bot that may assist with common requests. After a few stakeholder interviews, the following requirements documented in SCRUM user stories have been included below.

The following are the general system requirements:*

1. System Name: Richie AI **(1 mark)**
2. Client side and server side logging **(2 mark)**
3. Client/Server Architecture **
4. Database (any database vendor or ORM may be used)**^
5. Appropriate exception handling **(5 marks)**
6. User Friendly **(7 marks)**
7. Appropriate input validation **(3 marks)**

The following are scenario specific requirements:

1. The rating table is similar to the Hackney Carriage with the following modifications:
    a. Base price for a cab is JMD$ 350.00
    b. Price for a cab is base price + JMD$ 20 for every km

* Each member should contribute equally to the completion of the project (i.e. implementation in code). Otherwise the individual grade assigned will be prorated based on the contributions.
** A project that does not
- implement a client server architecture
- Have only the server communicating with the database
- use a database

cannot attain more than 50% of the overall grade
^ Using an online/cloud database may impede your final presentation if you experience network issues.

User requirements as SCRUM User Stories:

Cab Request

As a passenger, I should be able to request whether there are any available cabs to take me from one point in Jamaica to another in Jamaica using Natural Language.

As a passenger, I should be able to request a quote (price) and distance(in km) and image of my intended route from one point in Jamaica to another point in Jamaica using Natural Language.
- Distance may be calculated with the assistance of a live API or by the number of characters in the source and destination name i.e. if someone wants to travel from “Half Way Tree” to “Papine” the distance would be 19 km.
- You are allowed to restrict which trips you facilitate to no less than four (4) places

As a passenger, I should be able to confirm an available cab from one point in Jamaica to another point in Jamaica.

As a passenger, I should be able to confirm that my cab has picked me up.

As a passenger, I should be able to rate my overall cab experience (between 1-5 with 5 being the highest) and optionally provide feedback in comments.

As the system, I should keep track of confirmed cabs as confirmed cabs will be unavailable for 5 seconds for every km.

Cab Management

As the cab manager, I should be able to login using my email address and password.

As the cab manager, I should be able to view a summary report detailing the total distance travelled and total amount earned for each cab.

As the cab manager, I should be able to view a report listing all cab requests which were not fulfilled due to unavailable cabs.

As the cab manager, I should be able to commission a new cab (id, driver name, driver trn, motor vehicle model and motor vehicle year) for the company.

As the cab manager, I should be able to view user submitted feedback on a specific cab so that I may determine whether this cab is a good asset to my company.

As the cab manager, I should be able to decommission (specify that a cab is not available) a cab.

Customer Service

As a customer, I should be able to leave a message for a Customer Service Representative to respond to later via e-mail. The message should capture my full name, email address, type of query (tour service/support/other), date and time the message was sent and the message.

Bonus

- User is able to speak (audio) to the virtual assistant to perform transactions
- Appropriate audio and icons are utilized after each transaction to communicate whether the operation was successful
- Live and Interactive Map

Deliverables:
- Source Code
- Executable application (eg. executable jars)
- User manual/video (observe https://nciphub.org/collections/post/478/download/IEEE_Standard1063.pdf)
- Declaration of authorship (collected at interviews)

Assessment Pieces:
- Source Code
- User Manual/Video
- Interview

Final Submission Guidelines
Due Date : End of week 11

Submit Written Report (including user manual) by 11:59 pm to your tutor via email.
The email subject and report should be saved as :

the initials of the **first name of_AP_GROUP_PROJECT_2019**

Eg. If the five members of the group have first names, Sarah, Dario, Sam, Marcus and Harry the subject of the email should be:
SDSMH_AP_GROUP_PROJECT_2019

And the written report should be saved as
SDSMH_AP_GROUP_PROJECT_2017.docx or SDSMH_AP_GROUP_PROJECT_2017.pdf

If you choose to submit a video, it is recommended that a link to the video by provided (eg. YouTube or a file sharing service where it can be downloaded)

Each interview will be 25 minutes and will be conducted based on a given schedule.