Allstate Java Foundation Course

Practice Project

Introduction

The goal of this project is to reinforce the technical skills taught during the training programme, and in particular to provide an opportunity to use the technology in the development of a real-world style business application.

During this project, you will be required to perform the design, implementation and testing necessary to build a representative application for use within Allstate using the Java programming language.

Objectives

Successful completion of the project will require:

- The development of a complete application that meets the Application Specification assigned to you from the specifications provided below
- The application must:
    - Complete every aspect of the requirements
    - Be runnable from the command line (not within an IDE), with no errors occurring
    - Include any specified tests of business logic.
- You will be asked to give a short demonstration of your application.

Project Review Criteria

By way of a checklist, when instructors and others review your project, they will be looking for evidence of the following:

- A demonstration of a fully working system, showing that all the minimum requirements have been met.
- The ability to explain code choices you have made.
- Code written to a good standard, with an appropriate structure, and tests of any business logic in place.

Teamwork and support

Although some of your colleagues are also working on the same project, you are expected to create your own complete application individually. You may discuss options and compare notes throughout the development process, but you should not actively work on building the system together.

To help you develop this project, you may wish to make use of some or all the following resources:

- The provided course slides and notes
- The recordings of the training sessions
- The sample code created during the course and available via the GitHub repositories

Good luck!

You will be allocated 1 of the following 5 projects to work on.

Allstate Java Foundation Course

Practice Project 1 - Human Resources

Application Specification

The Human Resources department are replacing their staff management system. As part of the process to transition to the new system, they wish to go through a data clean-up exercise, and you have been asked to create an application which will assist this clean-up process.

A file has been created containing an extract of the data from the current system. The table below shows the format of this file with some example records. You have been given a file containing a sample of the records, called employees.csv (the input file), which you can use to develop and test your application, which will later be run against the full company data.

You are required to create an application which will do the following:

(1) read in the input file

(2) validate each record as follows:

- if either the first name or the surname field is missing, this is not a valid record
- if the salary is less than or equal to zero, this is not a valid record
- all other records are valid.

(3) Any records that are determined to be invalid should be written out to a new csv file using the same format as the input file.

(4) All valid records should be saved to a mysql database. You may design the database table(s) however you wish.

Your application design must include the creation of a class to model the Employee object, and should be compiled to a runnable Jar file that can be executed from the command line.

You should include unit tests to ensure you have implemented the validation rules correctly.

Employees.csv format:

EmployeeID	Title	FirstName	Surname	ManagerEmployeeID	StartDate	Salary
4561	Mr	Philip	Peterson	3306	2021-06-15	43000
4562	Mx		Sanderton	3306	2021-06-15	48000
4567	Dr	Michael		425	2021-06-16	26000

Allstate Java Foundation Course

Practice Project 2 – Fraud Review

Application Specification

There has been some concern about the rising level of fraudulent claims on some insurance policies. The fraud investigation team have asked you to help them decide which claims should be reviewed by developing an application to prioritize potentially fraudulent claims.

A list of claims made each day will be extracted to a file. You have been provided with a sample called claims.csv (the input file). You will use the sample to develop and test your application, which will later be run daily with real claim data. The table below shows the format of this file with some example records.

You are required to create an application which will do the following:

(1) read in the input file

(2) review each record and give it a score of 0, 1 or 2. The rules for scoring each claim are as follows:

- Each claim starts with a score of zero.

- Add 1 to this score if the date of claim is within 14 days of the policy origination date

- Add 1 to this score if the amount of the claim is greater than 50% of the value insured.

(3) All records should be saved to a mysql database with a field indicating the score. You may design the database table(s) however you wish.

Your application design should include the creation of a Class to model the Claim object, and should be compiled to a runnable Jar file that can be executed from the command line.

You should include unit tests to ensure you have implemented the scoring rules correctly.

Claims.csv format:

ClaimID	PolicyID	PolicyStartDate	DateOfClaim	ValueInsured	AmountClaimed
4561	P2206	2021-04-06	2021-06-15	45000	33000
4562	P0411	2019-12-15	2021-06-15	16000	4000
4567	P2775	2021-06-04	2021-06-16	92500	58500

Allstate Java Foundation Course

Practice Project 3 – Call Centre Volumes

Application Specification

The company is concerned that a call centre may be understaffed at certain times of the day. The resource management team have asked you to develop an application which can be used to collate information about call volumes.

You have been provided with a file called call-log.csv (the input file) containing a sample log of calls received by a call centre over the period of 1 day. The table below shows the format of this file with some example records. You are to use this sample file to develop and test your application, which will later be run daily with real call centre logs.

You are required to create an application which will do the following:

(1) read in the input file

(2) using the data in this file calculate for each hour of the day:

- the number of calls attempted

- the number of calls answered

- the number of calls abandoned

- the average wait time for calls that were answered.

The call should be logged according to the start time. For example a call starting at 15.59 which is answered at 16.02 will be logged as a call between 15:00 and 16:00

(3) Save this data to a mysql database.

Your application design should include a Class to model the information that needs to be saved to the database (you may wish to call this HourlyCallAnalysis) containing fields to record the hour of the day and the different required metrics. The application should be compiled to a runnable Jar file that can be executed from the command line.

You should include at least 1 test to ensure you have implemented the average wait time calculation correctly.

Call-log.csv format:

CallId	StartTime	Answered	Abandoned	EndTime
4561	08:17	08:19		08:28
4562	08:18		08:20	
4567	08:18	08:22		08:26

Allstate Java Foundation Course

Practice Project 4 – Desk Usage

Application Specification

Folowing the pandemic, many staff are undertaking flexible working arrangements, and the building management services team have decided to review how many desks are needed to support those workers coming into the offices.

You have been provided with a file called access.csv (the input file) which contains a sample log of all users who have entered different offices throughout the period of a day. You will use this file to develop and test your application, which will later be run daily using real log files created by entry turnstiles in each building. The table below shows the format of this file with some example records.

You are required to create an application which will do the following:

(1) read in the input file

(2) using the data in this file calculate how many staff entered each floor of each building during each hour of the day. For example, the calculation should reveal x staff entered the 2nd floor of the Argent Building between 13.00 and 14.00.

(3) As part of the calculation a member of staff who enters a section of a building more than once during the same hour of the day should only be counted once.

(4) Save the results to a mysql database. You may design the database table(s) however you wish.

Your application design should include a Class to model the information that needs to be saved to the database (you may wish to call this BuildingUsage) containing fields to record the building, the floor number, the hour of the day, and the number of unique staff users. It should be compiled to a runnable Jar file that can be executed from the command line.

You should include at least 1 test to ensure you have implemented the requirement to avoid duplicate entries correctly.

Access.csv format:

TurnstileID	Building	Floor	DateOfEntry	TimeOfEntry	StaffID
550	Argent	2	2022-04-06	09:16	4055
550	Argent	0	2022-04-06	09:16	4062
701	Collab	1	2022-04-06	09:18	1135

Allstate Java Foundation Course

Practice Project 5 – IT Support

Application Specification

The management for the IT support team are concerned that the number of support calls they have received has risen dramatically over the last few weeks. They have asked you develop an application which will categorize the support calls received.

You have been provided with a file called calls.csv (the input file) containing a sample list of the various support calls received over the period of a week. The table below shows the format of this file with some example records. You will use this file to develop and test your application which will later be run daily against the real system call logs.

You are required to create an application which will do the following:

(1) read in the input file

(2) using the data in this file determine for each type of hardware and software package, how many calls were received, at each severity level. For example, the calculation should reveal x calls were received about Microsoft Excel at severity level 2.

(3) some users may have called about the same issue more than once, so you should exclude any duplicates from your calculations.

(4) Save the results to a mysql database. You may design the database table(s) however you wish.

Your application design should include a Class to model the information required to be saved to the database (you may wish to call this SupportCategory) containing the fields to record the issue type, the issue object the severity level and the number of unique calls. It should be compiled to a runnable Jar file that can be executed from the command line.

You should include at least 1 test to ensure you have implemented the requirement to avoid duplicate calls correctly.

Calls.csv format:

Call	IssueType	IssueObject	Severity	StaffID
117	Hardware	Printer	3	4055
118	Software	Microsoft Excel	1	4062
119	Hardware	Scanner	3	1135