Curtin University – Discipline of Computing
Programming Design and Implementation (COMP1007/5011)
2022 Semester Two

Mid Semester Assessment

Released: 11:00AM (AWST), Wednesday 31 August 2022.
Last Possible Upload: 10:59AM (AWST), Friday 2 September 2022.
Late Penalties will be applied to submissions made after 10:59AM (AWST), Friday 2 September 2022.

Please carefully read this front cover.
Incorrectly following these steps may result in penalties.

This is an **OPEN BOOK** assessment. There are **two (2) questions for COMP1007 students and three (3) questions for COMP5011 students**. Answer all appropriate questions for the unit you are enrolled in.
• COMP1007 has 130 **marks** available;
• COMP5011 has 140 marks available.

It is recommended that you write in Vim (Terminal Based Text Editor) on VDI solution (https://mydesktop.curtin.edu.au), or your own version of Linux. Your code will be assessed on the VDI/lab machines.

• Task One is to be stored in its own `.txt` file named: `TaskOne.txt`
• Task Two is to be stored in its own `.java` file named `TaskTwo.java`.
• Task Three (COMP5011 students only) is to be stored in its own `.txt` file named: `TaskThree.txt`

Your code needs to conform to the practices emphasised in the lectures and practicals.

You must work alone on this assessment. You must not communicate with anyone other than your Lecturer/Unit Coordinator regarding any aspect of this Assessment.

Your submission will be subjected to plagiarism testing, collusion and other forms of academic integrity testing. You must cite any and all code from any source (**NOT** including the code from the lecture slides, practicals or what you have so far produced within COMP1007/5011).

Upon Completion, you must **tar** and **gzip** into a single archive your:
    1) Signed Declaration of Originality;
    2) Design file (`.txt`);
    3) Java file (`.java`); and
    4) Task Three file (COMP5011 students only).
and submit via Blackboard.

*PLEASE NOTE, BLACKBOARD DOES **NOT** PROVIDE A RECEIPT FOR YOUR SUBMISSION. YOU CAN CHECK YOUR SUBMISSION YOURSELF TO SEE IF IT HAS BEEN SUCCESSFULLY UPLOADED. DO **NOT** EMAIL A COPY OF YOUR SUBMISSION TO THE UNIT STAFF, IT WILL NOT BE ASSESSED.*

The Description

You have been hired by the Curtin University, Earth and Planetary Sciences Marine Biology team to create a small piece of software to assist them in analysing the number of shark sightings, by specific species, at specific locations. The software must keep track of the number of shark sightings, by species, over a 5-day period. The shark species that can be sighted are listed below:

- Great White;
- Tiger;
- Grey Nurse; and
- Mako.

You must keep track of the number of sightings for each of these species on each of the 5 days.

Your program will ask the user to enter the number of sightings of each species on each day. Once your program has received that information, it will then prompt the user with following options:

1. Display the average number of sightings for each species over the 5 days;
2. Display the species with the highest number of sightings on any day;
3. Display the species with the lowest number of sightings on any day;
4. Display the percentage breakdown of the total sightings by species (e.g. Great Whites 40%, Tiger 30%, Grey Nurse 20%, Mako 10%);
5. Display the day that had the largest total number of shark sightings; and
6. An exit option, which should quit the program without explicitly interrupting program flow (i.e. without the use of System.exit or break). If this option is not selected, the program should loop and show the menu again after another option has completed execution.

NOTE: You do not need to consider any other possibilities other than those stated above.

The Tasks

SPECIAL INSTRUCTIONS
- **COMP**1007 **S**tudents: complete **T**ask **O**ne and **T**ask **T**wo **ONLY**;
- **COMP**5011 **S**tudents: complete **ALL OF T**ask **O**ne, **T**ask **T**wo and **T**ask **T**hree.

Task One (50 marks):
Write the pseudocode for the complete program.

Task Two (80 marks):
Convert your pseudocode into a working Java program. Your code should be well commented and comply with the standards taught so far in the unit as well as utilise the techniques and structures taught in the unit.

Task Three – COMP5011 STUDENTS ONLY (10 marks)
Modify your pseudocode to add in an additional option to display the total number of shark sightings of all species over all days. Implement this change in your Java program. In a separate document, briefly (approx. one paragraph) comment on how you could modify the program structure to reduce duplicated code for option five and this additional option.

Tips:
- **U**se four arrays (one for each species), with each element storing the number of sightings from one day for that species.
- **E**nsure that the user enters data with the correct data type. If an incorrect data type is entered, you may display an error message and exit the program.
- **V**alidation: ensure that the number of sightings is valid. It is up to you to determine what this means.

Example Program Formatting Output (anything inside **< >** is user input). This is only an example of the output formatting. You may choose to do yours differently.

```
  ************************************************************
  |     Welcome to the Earth and Planetary Sciences Shark    |
  |              Sightings Program Analyser.                  |
  |      The program tracks the number of sightings          |
  |         of specific shark species over 5 days.           |
  ************************************************************

Data Entry:
Please enter the sightings count for the Great White shark:
Day 1: < sightings count >
Day 2: < sightings count >
Day 3: < sightings count >
Day 4: < sightings count >
Day 5: < sightings count >
----------
Please enter the sightings count for the Tiger shark:
Day 1: < sightings count >
Day 2: < sightings count >
Day 3: < sightings count >
Day 4: < sightings count >
Day 5: < sightings count >
----------
Please enter the sightings count for the Grey Nurse shark:
Day 1: < sightings count >
Day 2: < sightings count >
Day 3: < sightings count >
Day 4: < sightings count >
Day 5: < sightings count >
----------
Please enter the sightings count for the Mako shark:
Day 1: < sightings count >
Day 2: < sightings count >
Day 3: < sightings count >
Day 4: < sightings count >
Day 5: < sightings count >
==================
Data Entry Complete
==================
```

```
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
Menu Choice:
> 1. Display average daily sightings for each species during the 5 days;
> 2. Display species with the highest number of sightings;
> 3. Display species with the lowest number of sightings;
> 4. Display day with largest number of shark sightings (include number);
> 5. Display percentage breakdown of the total sightings by species(e,g,
     Great Whites 40%, Tiger 30%, Grey Nurse 20%, Mako 10%);
> 6. Exit the program
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=

Your choice:  <choice><following output assumes choice was 4>
Day 2 had the largest number of sightings: 63


=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
Menu Choice:
> 1. Display average daily sightings for each species during the 5 days;
> 2. Display species with the highest number of sightings;
> 3. Display species with the lowest number of sightings;
> 4. Display day with largest number of shark sightings (include number);
> 5. Display percentage breakdown of the total sightings by species
     (e.g. Great Whites 40%, Tiger 30%, Grey Nurse 20%, Mako 10%);
> 6. Exit the program
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
```