Computer Science 2A

Practical Assignment 00

Assignment date: 2024-02-13

Deadline 2024-02-20 12h00

Marks: 30

This practical assignment must be uploaded to eve.uj.ac.za **before** 2024-02-20 12h00. Late[1] or incorrect submissions **will not be accepted**, and will therefore not be marked. You are **not allowed to collaborate** with any other student.

Good coding practices include a proper coding convention and a good use of documentation. Marks will be deducted if these are not present. Every submission **must** include a batch file unless stated otherwise.

The **reminder page** includes details for submission. Please ensure that **ALL** submissions follow the guidelines. The reminder page can be found on the last page of this practical.

This practical aims to familiarise you with the **Java Development Kit (JDK)** and basic **Java**.

Create a **Twang** class. The class loops through numbers from 1 to **n** (inclusive) and prints out that number unless one of the following conditions occur:

- If the number is divisible by 3 output **BANJO**
- If the number is divisible by 5 output **GUITAR**
- If the number is divisible by 3 and 5 output **HARP**

The value of **n** is provided as a command line argument.

Expected Output - Use these values to check your program[2].

Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Output	1	2	BANJO	4	GUITAR	BANJO	7	8	BANJO	GUITAR	11	BANJO	13	14	HARP	16	17	BANJO	19	GUITAR	BANJO	22	23	BANJO	GUITAR	26	BANJO	28	29	HARP

Create a batch file called ***`build.bat`***. Complete the following tasks in the batch file:

1. Create command line variables for the required folders (relative to the main project folder).
2. Set **JAVA_HOME** and add the **JDK** bin folder to the PATH.
3. Use *javac* to compile the code found in the `src` folder and output to the `bin` folder. *Hint: use the variables you created*.
4. Use *java* to run the code in the `bin` folder.
5. Use *javap* to decompile the class file in the `bin` folder and save the output to a file called *ByteCode.txt*. The *ByteCode.txt* file should be placed in the `docs` folder.

[1] Alternate arrangements for exceptional circumstances will been posted on eve.

[2] These are not all values!

Bonus

Submit the bonus project as a separate zip file with the practical number as `P00_B`. Failure to do so will result in issues with marking the normal practical and lead to a loss of marks!

Place your **Twang** program into the ***acsse.csc2a*** package and update the batch file accordingly.

Create an array to store the output. Process the numbers, store the result in the output array and display the output by looping over the array.

Mark Sheet

1. Submission
   (a) Correct naming **[01]**
   (b) Correct folders **[01]**
   (c) Correct files in folders **[01]**
2. Batch file
   (a) Variables **[03]**
   (b) **JAVA_HOME** in PATH **[03]**
   (c) Compilation command **[02]**
   (d) Execution command **[02]**
   (e) ByteCode command **[02]**
3. Correct execution **[15]**
4. Packages **[05 (bonus)]**
5. Output array **[05 (bonus)]**

Total **[30]**

NB

Submissions which **do not compile** will be capped at 40%!

Practical marks are awarded subject to the student's ability to explain the concepts and decisions made in preparing the practical assignment solution. (Inability to explain code = inability to be given marks.)

Execution marks are awarded for a correctly functioning application and not for having related code.

Reminder

Your submission must follow the naming convention below.

`SURNAME_INITIALS_STUDENTNUMBER_SUBJECTCODE_YEAR_PRACTICALNUMBER`

Example

Surname	Berners-Lee	**Module Code**	CSC02A2
Initials	TJ	**Current Year**	2024
Student number	209912345	**Practical number**	P00

`Berners-Lee_TJ_209912345_ CSC02A2_2024_P00`

Your submission must include the following folders:

Folder	State	Purpose
`bin`	*Required*	Should be empty at submission but will contain runnable binaries when your submission is compiled.
`docs`	*Required*	Contains the batch file to compile your solution, UML diagrams, and any additional documentation files. All files must be in **PDF** format. Your details must be included at the top of any **PDF** files submitted. **Do not include generated JavaDoc.**
`src`	*Required*	Contains all relevant source code. Source code must be places in relevant sub-packages! Your details must be included at the top of the source code.
`data`	*Optional*	Contains all data files needed to run your solution.
`lib`	*Optional*	Contains all libraries needed to compile and run your solution.

NB

Every submission **must** include a batch file that contains commands which will:

- Compile your Java application source code.
- Compile the associated application JavaDoc.
- Run the application.

Do not include generated JavaDoc in your submission. All of the classes/methods which were created/updated need to have JavaDoc comments.

Multiple uploads

Note that only **one** submission is marked. If you already have submitted once and want to upload a newer version then submit a newer file with the same name as the uploaded file in order to overwrite it.