

CO1105 CW2 Project Report

Class Files

Main.java:

This is the main file of the project and uses a scanner to allow the input of student data such as name and marks. This file creates an array for all students and prompts the user to choose how the marks should be printed between printing all modules, CW001, EX002 and CE003. Regarding the user input, the console will output the headers and data in a tabular format. There is a while loop embedded to continue prompting the user to print again for a different module and allows them to exit the loop when done.

Student.java:

This class will be used to create the array of students and will set all required public and private attributes. This includes the first name, surname, ID, along with the module marks. All students will be objects of the Student class and this class will be used to set and get these private attributes for each student in order to print them out in the table in the Main file.

Module.java:

This is a public abstract class that will be inherited by the three concrete classes mentioned below as they are all modules. The Module class contains the private attributes needed. All modules will have a name, along with status (0, 1 or 2) and a final mark. This abstract class therefore acts as a superclass.

CW001.java:

This is a subclass that extends the abstract Module class. CW001 contains both homework along with a project which are included in the subclass along with the weightings for the homework marks (50%) and the project mark (50%).

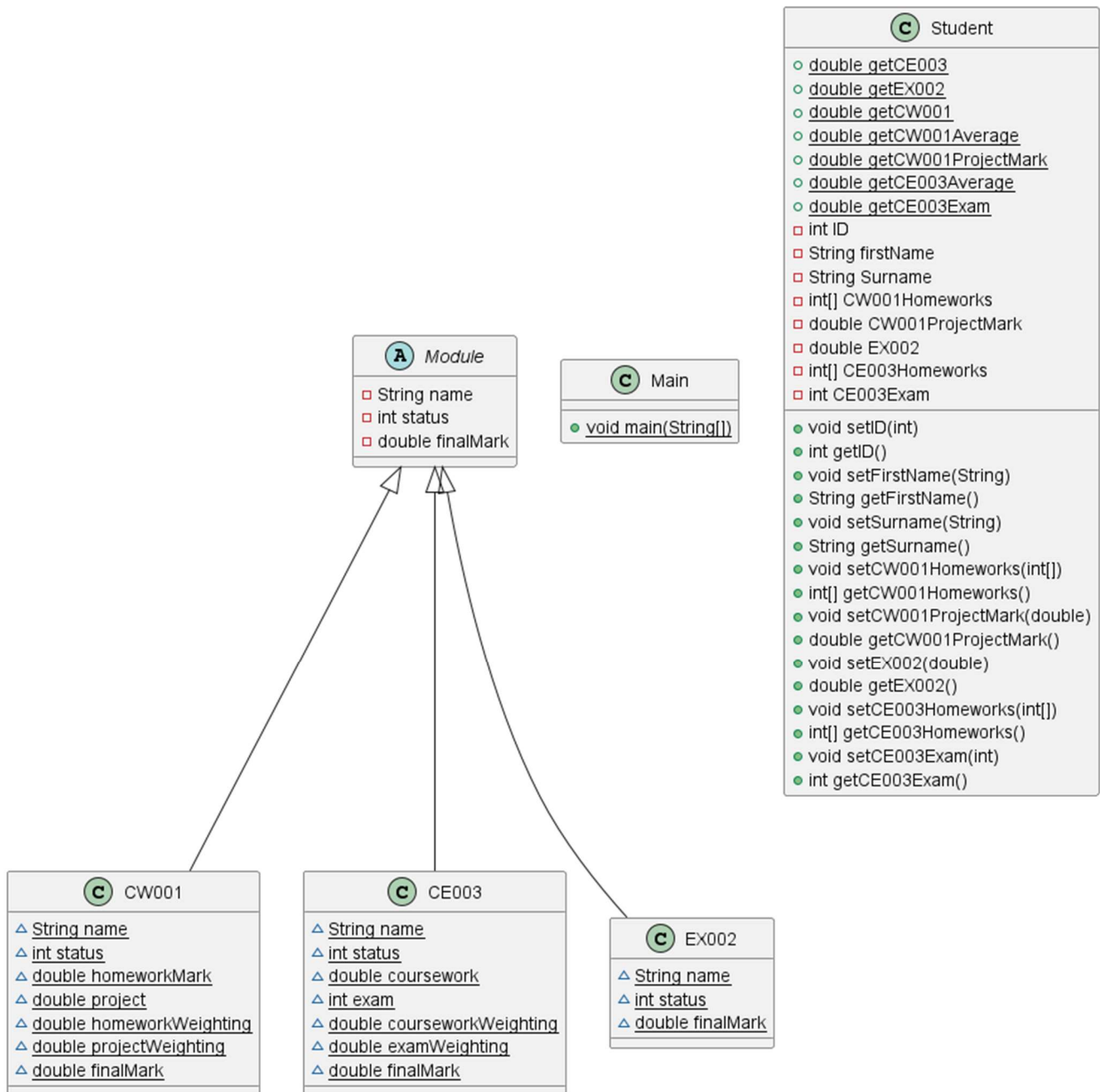
EX002.java:

This is a subclass that extends the abstract Module class. EX002 is the second module and contains only an exam mark therefore, it does not require any weightings and there is no coursework in this module.

CE003.java:

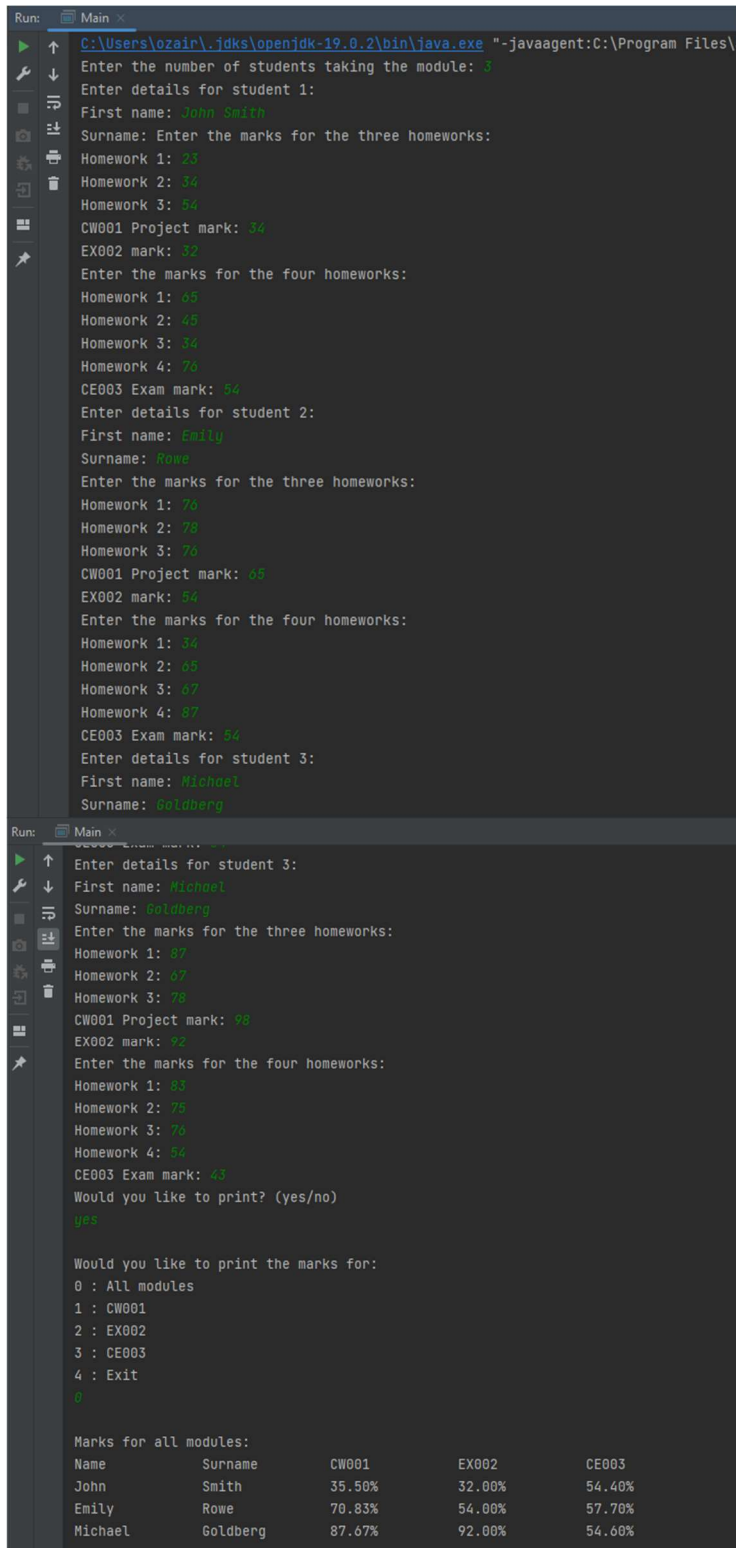
This is a subclass that extends the abstract Module class. CE003 contains both homework along with a project which are included in the subclass along with the weightings for the homework marks (40%) and the project mark (60%).

UML Diagram



Code Execution

This is one execution of the code. As you can observe, a loop was used in order to maintain convenience for the user and prevent the hassle of repeatedly having to run again and input data.



```
Run: Main x
C:\Users\ozair\.jdk\openjdk-19.0.2\bin\java.exe "-javaagent:C:\Program Files\J
Enter the number of students taking the module: 3
Enter details for student 1:
First name: John Smith
Surname: Enter the marks for the three homeworks:
Homework 1: 23
Homework 2: 34
Homework 3: 54
CW001 Project mark: 34
EX002 mark: 32
Enter the marks for the four homeworks:
Homework 1: 65
Homework 2: 45
Homework 3: 34
Homework 4: 76
CE003 Exam mark: 54
Enter details for student 2:
First name: Emily
Surname: Rowe
Enter the marks for the three homeworks:
Homework 1: 76
Homework 2: 78
Homework 3: 76
CW001 Project mark: 65
EX002 mark: 54
Enter the marks for the four homeworks:
Homework 1: 34
Homework 2: 65
Homework 3: 67
Homework 4: 87
CE003 Exam mark: 54
Enter details for student 3:
First name: Michael
Surname: Goldberg
CE003 Exam mark: 54
Enter details for student 3:
First name: Michael
Surname: Goldberg
Enter the marks for the three homeworks:
Homework 1: 87
Homework 2: 67
Homework 3: 78
CW001 Project mark: 98
EX002 mark: 92
Enter the marks for the four homeworks:
Homework 1: 83
Homework 2: 75
Homework 3: 76
Homework 4: 54
CE003 Exam mark: 43
Would you like to print? (yes/no)
yes
Would you like to print the marks for:
0 : All modules
1 : CW001
2 : EX002
3 : CE003
4 : Exit
0
Marks for all modules:
Name      Surname    CW001      EX002      CE003
John      Smith      35.50%     32.00%     54.40%
Emily     Rowe       70.83%     54.00%     57.70%
Michael   Goldberg   87.67%     92.00%     54.60%
```

```
Run: Main x
Michael      Goldberg      87.67%      92.00%      54.60%

Would you like to print the marks for:
0 : All modules
1 : CW001
2 : EX002
3 : CE003
4 : Exit
1

Marks for CW001:
Name      Surname      Hws      Project      Final Mark
John      Smith      37.00%      34.00%      35.50%
Emily      Rowe      76.67%      65.00%      70.83%
Michael      Goldberg      77.33%      98.00%      87.67%

Would you like to print the marks for:
0 : All modules
1 : CW001
2 : EX002
3 : CE003
4 : Exit
2

Marks for EX002:
Name      Surname      Final Mark
John      Smith      32.00%
Emily      Rowe      54.00%
Michael      Goldberg      92.00%

Would you like to print the marks for:
0 : All modules
1 : CW001
2 : EX002
3 : CE003
4 : Exit
3

Marks for CE003:
Name      Surname      CW      Exam      FinalMark
John      Smith      55.00%      54.00%      54.40%
Emily      Rowe      63.25%      54.00%      57.70%
Michael      Goldberg      72.00%      43.00%      54.60%

Would you like to print the marks for:
0 : All modules
1 : CW001
2 : EX002
3 : CE003
4 : Exit
4

Process finished with exit code 0
```

C:\Users\ozair\.jdk\openjdk-19.0.2\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.3.3\lib\idea_rt.jar=54520:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.3.3\bin" -Dfile.encoding=UTF-8 -Dsun.stdout.encoding=UTF-8 -Dsun.stderr.encoding=UTF-8 -classpath "C:\Users\ozair\Coding Projects\Java Projects\CW2\out\production\CW2" Main

Enter the number of students taking the module: 3

Enter details for student 1:

First name: John Smith

Surname: Enter the marks for the three homeworks:

Homework 1: 23

Homework 2: 34

Homework 3: 54

CW001 Project mark: 34

EX002 mark: 32

Enter the marks for the four homeworks:

Homework 1: 65

Homework 2: 45

Homework 3: 34

Homework 4: 76

CE003 Exam mark: 54

Enter details for student 2:

First name: Emily

Surname: Rowe

Enter the marks for the three homeworks:

Homework 1: 76

Homework 2: 78

Homework 3: 76

CW001 Project mark: 65

EX002 mark: 54

Enter the marks for the four homeworks:

Homework 1: 34

Homework 2: 65

Homework 3: 67

Homework 4: 87

CE003 Exam mark: 54

Enter details for student 3:

First name: Michael

Surname: Goldberg

Enter the marks for the three homeworks:

Homework 1: 87

Homework 2: 67

Homework 3: 78

CW001 Project mark: 98

EX002 mark: 92

Enter the marks for the four homeworks:

Homework 1: 83

Homework 2: 75

Homework 3: 76

Homework 4: 54

CE003 Exam mark: 43

Would you like to print? (yes/no)

yes

Would you like to print the marks for:

0 : All modules

1 : CW001

2 : EX002

3 : CE003

4 : Exit

0

Marks for all modules:

<u>Name</u>	<u>Surname</u>	<u>CW001</u>	<u>EX002</u>	<u>CE003</u>
<u>John</u>	<u>Smith</u>	<u>35.50%</u>	<u>32.00%</u>	<u>54.40%</u>
<u>Emily</u>	<u>Rowe</u>	<u>70.83%</u>	<u>54.00%</u>	<u>57.70%</u>

Michael	Goldberg	87.67%	92.00%	54.60%
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Would you like to print the marks for:

0 : All modules

1 : CW001

2 : EX002

3 : CE003

4 : Exit

1

Marks for CW001:

Name	Surname	HWs	Project	Final Mark
John	Smith	37.00%	34.00%	35.50%
Emily	Rowe	76.67%	65.00%	70.83%
Michael	Goldberg	77.33%	98.00%	87.67%

Would you like to print the marks for:

0 : All modules

1 : CW001

2 : EX002

3 : CE003

4 : Exit

2

Marks for EX002:

Name	Surname	Final Mark
John	Smith	32.00%
Emily	Rowe	54.00%
Michael	Goldberg	92.00%

Would you like to print the marks for:

0 : All modules

1 : CW001

2 : EX002

3 : CE003

4 : Exit

3

Marks for CE003:

<u>Name</u>	<u>Surname</u>	<u>CW</u>	<u>Exam</u>	<u>FinalMark</u>
<u>John</u>	<u>Smith</u>	<u>55.00%</u>	<u>54.00%</u>	<u>54.40%</u>
<u>Emily</u>	<u>Rowe</u>	<u>63.25%</u>	<u>54.00%</u>	<u>57.70%</u>
<u>Michael</u>	<u>Goldberg</u>	<u>72.00%</u>	<u>43.00%</u>	<u>54.60%</u>

Would you like to print the marks for:

0 : All modules

1 : CW001

2 : EX002

3 : CE003

4 : Exit

4

Process finished with exit code 0

Project Evaluation

Overall, the project was done very successfully as the output given is identical to the example output provided in the coursework description. Upon running the project, the user is prompted to enter the number of students along with the students details and marks which is then set and retrieved. The data is then provided in the table for the modules that the user chooses to print.

One thing that was done well was the while loop used at the end. This allows the user to print a table for all modules so one will only need to run the program once. This provides user convenience which I consider a good strength for the project. Another thing done well was the use of all the classes along with the calculation of the final marks where I used the weightings for each module. In addition, the class files are easy to read with detailed, systematic comments that help to explain the principles used. There are a wide range of methods and principles used such as inheritance, super classes, for loops, while loops, and abstraction and this has built confidence for when these will be used again in the future.

However, I did find this work challenging compared to other coursework. There was difficulty in receiving a correct output as many methods refused to operate in the intended way and some marks were outputted as 0, causing a 'null' error. After thorough revision of the code, the issue was resolved using a constructor which allows the initialisation of student objects. Towards the end of the project, after testing the output with different values I found that the final marks could contain long or recurring decimals which would affect the tabular structure. Again, a simple fix using the 'String.format("%.2f", value)' function. This rounded all values to 2 decimal places. Another thing that would further strengthen the code would be to use exception handling so that all user inputs meet the requirements which would prevent strings or numerical values outside of the range being entered as marks.

Ultimately, this project was valuable in teaching me a great amount regarding OOP principles. I now have a more in-depth perspective regarding object-oriented programming. Thus, I am more versatile in the Java language, and I feel far more capable and comfortable in this language than when I had started this assignment. I aim to further my knowledge in OOP as learning to use abstraction and inheritance was difficult however, I can now say it was rewarding for I have acquired enriching programming experience. This experience will unquestionably be useful in further assignments and any future difficulties in Java.