

Worksheet Five

Man had always assumed that he was more intelligent than dolphins because he had achieved so much - the wheel, New York, wars and so on - whilst all the dolphins had ever done was muck about in the water having a good time. Conversely, the dolphins had always believed that they were smarter than man - for precisely the same reasons.

Douglas Adams, The Hitch Hikers Guide to the Galaxy 1979

Unit Learning Outcomes Addressed by this worksheet: 1 & 2

For all of the exercises below, clearly state the assertions which will be valid for each control structure used.

Make electronic copies of all of your algorithms. Place these, along with your Java code, in your P05 directory.

Exercise One.

Examine your algorithm for the tiling problem. Using selection control structures, modify your algorithm so that if the input is invalid it will output an error message.

Start by looking at your test input from worksheet four and determining all of the different categories of invalid input.

Next, for each input variable, list the criteria for validity as a pseudo code boolean expression.

Finally make suitable modifications to your pseudo code algorithm and hand test it to ensure it is correct. You will need to make use of IF-THEN-ELSE control structures and possibly introduce more sub module(s). Note that your main algorithm should require very little modification. Also note that your algorithm should output an error message for each item of invalid input.

Exercise Two.

Make a copy of your Java application from worksheet four and modify it so that it reflects the modifications you made to the pseudo code in exercise three.

Exercise Three.

Design an algorithm which inputs:

- A student's final mark (0 to 100)
- The number of assessments that the student completed which contributed to the final mark (0 to 5)

If the input is valid then the algorithm should use the rules below to output the student's grade. If the input is invalid then an error message should be output. Hint you will need to make use of IF-THEN-ELSE, CASE and sub modules.

Grade generation Rules:

- A student who completed zero assessments should be awarded a grade of DNA.
- A student who did not complete all assessments and who scored a final mark less than 50.0 should be awarded a grade of DNC-XX, where XX represents the final mark the student scored (e.g. DNC-32).
- A student who completed all of the assessments but scored a final mark less than 50.0 should be awarded a grade of F-XX, where XX represents the final mark the student scored (e.g. F-47).
- A student who scored a final mark greater than or equal to 50.0 should be awarded a grade of G-XX, where G represents the 10 digit of the final mark and XX represents the final mark the student scored (e.g. 7-78).

Exercise Four.

Think about the different categories of input and write down a set of test inputs which cover them all.

Use them to test your algorithm and ensure it will function correctly.

Exercise Five.

Finally translate your algorithm into a Java application.