Worksheet 6A: Testing (part 1)

Updated: 16th February, 2022

Attempt this worksheet individually. The next worksheet carries on from the work you will do here.

1. Equivalence Categories

For each of the following submodules, determine the complete set of equivalence categories. For each equivalence category, (1) give an appropriate test input/import, and (2) describe the expected output/export.

(a)

Submodule **calcGrade**
Imports: **mark (integer)**
Exports: **grade (string)**

Calculates a grade, given a mark. For marks less than 50, the grade is "F". For marks from 50 to 59, the grade is "5". For 60 to 69, the grade is "6", and so on up to "10". If mark is invalid, calcGrade will export the empty string "".

(b)

Submodule **roomVolume**
Imports: **width, length, height (reals)**
Exports: **volume (real)**

Calculates the volume of a room, but only if the imported width, length and height are valid. To be valid, width must be at least 2 (metres), length 2.5, and height 3. For invalid imports, this submodule will return 0.

(c)

Submodule **charCase**
Imports: **checkUpper (boolean), ch (character)**
Exports: **isCase (boolean)**

Checks whether or not ch is an upper/lowercase letter. If checkUpper is true, the submodule checks whether ch is uppercase, and return true/false accordingly. If checkUpper is false, the submodule instead checks whether ch is lowercase.

(Hint: there are lots of characters that are neither upper nor lowercase, of course.)

(d)

Submodule **substr**
Imports: **str1, str2 (strings)**
Exports: **s (string)**

Determines whether one string occurs inside the other. If it does, the submodule returns whichever string is shorter. If not, it returns the the empty string `""`. Note that the empty string is, by definition, contained inside every string (including itself).

For instance, if str1 is `"conscience"` and str2 is `"science"`, then this submodule returns `"science"`. If both imported strings are `"xyz"`, then the submodule returns `"xyz"`.

2. Boundary Value Analysis

(a) Apply BVA to the `calcGrade` submodule from the previous question.

(b) Apply BVA to the following submodule:

Submodule **uvRating**
Imports: **index (real)**
Exports: **rating (string)**

Determines a rating for ultraviolet radiation risk, based on a real-valued UV index. Ratings below zero are invalid, in which case the submodule returns `"-"`. Otherwise, if the index is below 3, the rating is `"low"`, then up to 6 for `"moderate"`, up to 8 for `"high"`, and up to 11 for `"very high"`. Any rating over 11 is `"extreme"`.

To Be Continued

You can proceed immediately to worksheet 6B.

End of Worksheet