Inft1004 Visual Programming – Lab for week 5

1. In the lab do the for week 5 quiz (Under the "Assessment/Quizzes" folder on blackboard)

   NOTE: E – Easy, M – Medium, H – Hard, T – Tricky

2. (E) Write a function that returns the Body mass Index (BMI). It should be called

   `calculateBodyMassIndex(weightKilograms, heightMeters)`

   BodyMassIndex (BMI) is calculated using the formula

   BMI = weight / height^2 *(where weight is in kilograms and height is in metres)*

3. (M) Write a function that can be used to test the `calculateBodyMassIndex` function in Q2. I suggest using the JES `requestNumber` function to get the weight and height values from the user. (Or you could hard code some test values if you feel lazy).

   It should print a message based on the persons BMI and their age. The message should show what category the person falls into.

   Note: Try using the `showInformation()` function in JES to show your messages.

Category	BMI
Very severely underweight	less than 15
Severely underweight	Greater than or equal to 15.0 and less than 16.0
Underweight	Greater than or equal to 16.0 and less than 18.5
Normal (healthy weight)	Greater than or equal to 18.5 and less than 25
Overweight	Greater than or equal to 25 and less than 30
Obese Class I (Moderately obese)	over 30

   (T) If you feel enthusiastic add in a check to make sure the user doesn't press the 'Cancel' button on the `requestNumber` window.)

4. (M) Write a function called

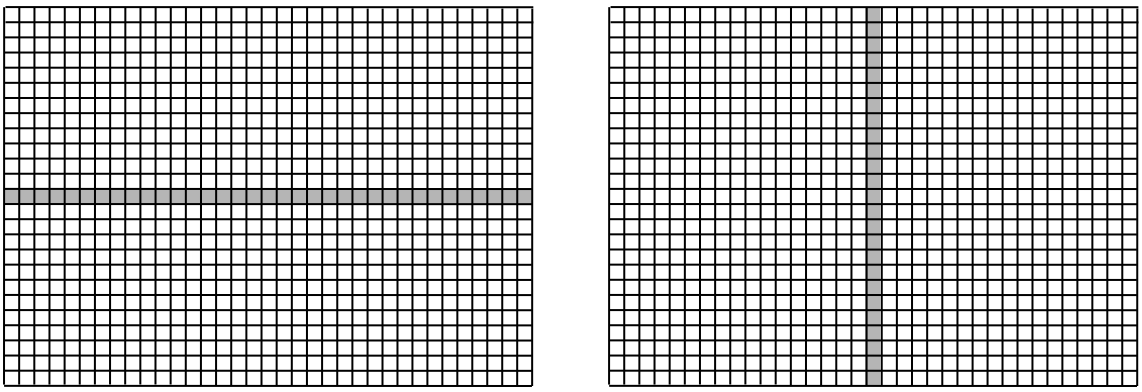
   `calculateWaterBill(litresUsed)`

   It calculates your water bill based on the number of mega litres of water you have used. The calculation is very simple. If the number of litres is less than or equal to 1000 then the bill is $130. If the water used is greater than 1000 litres but less than or equal to 3000 then the bill is $230. If the water used is more than 3000 litres but less than 6000 then the bill is $350. If the water used is greater than or equal to 6000 then the bill is $500.

   The function should return the price of a water bill. Make sure you test the function carefully.

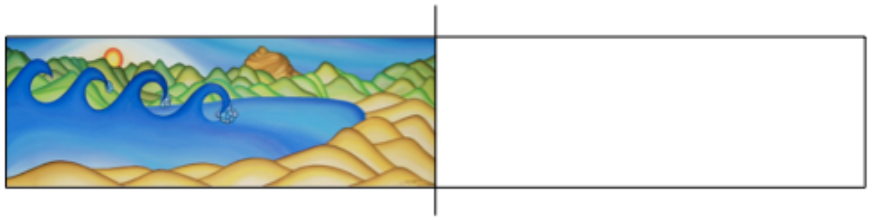
5. (M) Write a function that draws a horizontal "gray" line in approximately the middle of a picture. The line should go all the way across the picture. (Hint use a `for` statement and the `range` function to iterate through all the x values).

   After you do this you might want to try something similar but with a vertical line in the middle.

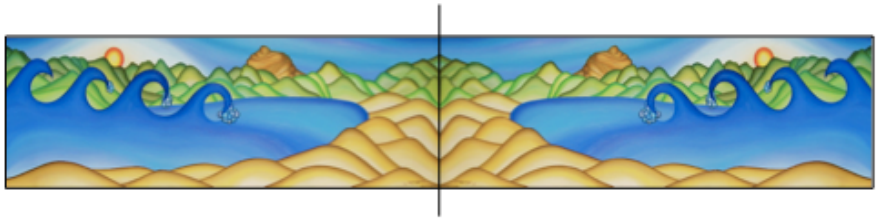


6. (H) Write and test a function that reflects an image about its vertical centre line. This function takes a picture as a parameter then creates a picture twice as wide, but the same height. It should copy all the pixels of the original image to the left side of the picture, and then reflect this images about the centre line to fill the right half of the image. The function should **return** the new reflected picture and should not affect the original image.

   HINTS : See lecture notes for more hints. There is also code for doing a horizontal reflection in this lecture. You could try and modify this code to solve the vertical reflection problem.



Step 1 – copy the pixel colours from the original to the new (larger picture)



Step 2 – do the reflection - copy pixel colours from the original to reflected locations on the new (larger picture)

7. (H) Write a function, called `isValidPosition(picture, x, y)`

   This function takes a picture as the first argument and an x position and y position of a pixel as the second and third arguments. Test the (x,y) position is valid by comparing the x and y value with the height and width of the picture. If the position is valid the function should return true otherwise it should return false.

8. (H) Write a function that can be used to test the function in question 7. This function should let the user pick a file and then make a picture from this file. Print the details of the picture. Allow the user to enter an x and y position (try using the `requestInteger()` function). It should then use the is `isValidPosition` function to test the validity of the pixel positions and show a warning if the pixel position is not valid or show an information message that the position is valid. If the position is valid it should get the pixel and print the details of this pixel. [Hint use the `showWarning()` and `showInformation()` functions.