CSC104 Assignment #1

Due: October 12th by 5pm
Value: 15%
Marks: 100

ALL ANSWERS SHOULD BE SUBMITTED AS PLAIN TEXT FILES(either (.TXT) or (.PY)).

Part 1: Pictures (50 marks)

Q1. In this question you are to examine the difference between grayscale by luminance and grayscale by perception weights.

1a. Write a function that **returns** the grayscale by luminance of **a single pixel**. **Do not output** anything(printing or displaying). **5 marks**

1b. Write a function that **returns** the grayscale by perception of **a single pixel. Do not output** anything(printing or displaying). **5 marks**

1c. Write a function that **uses the function from 1a** to change every pixel of a picture to its grayscale by luminance. This function should **display the picture after modifying it and return the modified picture. 10 marks.**

1d. Write a function that **uses the function from 1b** to change every pixel of a picture to its grayscale by perception. This function should **display the picture after modifying it and return the modified picture. 10 marks.**
10 marks.

1e. Run your functions from **1c** and **1d** on many different colour pictures.

1ei) What is the difference on reds? **2 marks**
1eii) What is the difference on blues? **2 marks**
1eiii) What is the difference on greens? **2 marks**
1eiv) Which function makes a better grayscale picture? Why? **4 marks**

1f. Run the following combinations of functions repeatedly on the same picture, and compare the middle picture to the final picture.

1fi) 1c followed by 1c. **1 mark**
1fii) 1c followed by 1d. **1 mark**
1fiii) 1d followed by 1c. **1 mark**
1fiv) 1d followed by 1d. **1 mark**
1fv) Why does this happen? **Hint:** You will want to explore what happens to a single pixel by the second algorithm. **6 marks**

For this question, **submit:Q1.py** containing all your programs, and **Q1.txt** containing all your text answers**.**

Part 2: Number Representations(20 marks)

Q2. Fill in the missing entries of the table. **Use an X if the representation is impossible**. Assume all binary or two's complement numbers use 8 digits. **Justify your answers** by showing written work in your submitted text file. Label each answer with the corresponding roman numeral. **20 marks total – 2 marks each.**

Binary	Two's Complement	Base 10
(i)	(ii)	**127**
(iii)	(iv)	**234**
10101010	(v)	(vi)
(vii)	**11001000**	(viii)
(ix)	**01101111**	(x)

For Q2 submit one file: **Q2.txt** containing answers and work for parts (i) to (x).

Part III: Sound(30 marks)

Q3. Write a function which when **given a sound** will **return a sound in which each sample value has been halved.** Do **NOT** play the sound or print to the screen – you may wish to do so during testing, but your final version should not. You should ensure your function runs, and attempt to check your answer by using the media tools. **15 marks**

For Q3 submit one file**:Q3.py** containing your python function.

Q4. Write a function which when **given a sound** will **return the first half of the sound.** Do **NOT** play the sound or print to the screen – you may wish to do so during testing, but your final version should not. You should ensure your function runs, and attempt to check your answer by using the media tools. **15 marks**

For Q4 submit one file:**Q4.py** containing your python function**.**

HINT: You may want to test your function by calling it repeatedly on a sound. The back end of many media samples has some empty white noise.