



Due: 4:30pm, Friday 14th February 2020.

Worth: This assignment is marked out of 30 and is worth 3% of your final mark.

- In your program there must not be any variables used outside any of the functions.
- From the CompSci 101 Assignment website: <https://www.cs.auckland.ac.nz/courses/compsci101ssc/assignments/>, download the skeleton Python program and rename the SkeletonA5.py file to "YourUsernameA5.py", e.g., afer023A5.py.
- Your program must include a docstring at the top of the file containing your name, your username and a correct description of the program.

Submission

Submit your Python program and your own pattern text file using the Assignment Dropbox: <https://adb.auckland.ac.nz/>.

This assignment first reads a list of colours from a text file and creates a list of colour strings. For example, the `colours.txt` contains the following lines:

```
black
white
red
...
```

and returns a list of strings:

```
["black", "white", "red", "orange", "yellow", "green", "cyan", "blue", "brown", "teal" ]
```

Next, your program reads lines of digits from a pattern text file and draws a grid of coloured rectangles based on the information stored in the text file. Each row of the picture corresponds to a line in the file, and each rectangle along the row corresponds to a digit in the line. For example, if the colour codes that we use are 0: black, 1: white, 2: red, 3: orange, 4: yellow, 5: green, 6: cyan, 7: blue, 8: brown and 9: teal, the following table shows the contents of the pattern file, "`tree.txt`" and the corresponding pixel art. The first row (11155111) represents 3 white rectangles, two green rectangles and three white rectangles.

tree.txt (simple mode)	Pixel Art
11155111	
11155111	
11555511	
11555511	
15555551	
55555555	
11188111	
11188111	

Steps:

1. Add your username to the title bar of the window (2 marks)

Currently the title bar of the program window displays "A5 by". Add your username to the title bar of the program, i.e., the title bar should display the string, "A5 by yourUsername", e.g., A5 by afer023.

2. Add a docstring at the top of the file containing your name, your username and a correct description of the program. (2 marks)

3. Complete the `read_colours(filename)` function (3 marks)

This function takes a filename as a parameter and returns a list of strings read from the input file.

4. Complete the `split_digits(line)` function (3 marks)

This function takes a String of digits as a parameter and returns a list of String elements. Each element of the list is made up of a digit (0, 1, 2, 3, 4, 5, 6, 7, 8 or 9). For example, the output produced by the following call to the function is shown below:

```
print("1.", split_digits('11155111'))  
1. [1, 1, 1, 5, 5, 1, 1, 1]
```

5. Complete the `process_file(filename)` function (5 marks)

This function takes a filename as a parameter and returns a list of strings read from the input file. For example, the output produced by the following call to the function is shown below:

```
lines = process_file("tree.txt")  
print("2.", lines)  
2. ['11155111', '11155111', '11555511', '11555511', '15555551', '55555555',  
'11188111', '11188111']
```

6. Complete the `read_pattern(filename)` function (5 marks)

This function takes a filename as a parameter. The function calls the `process_file()` defined above to read a pattern from a text file then returns a list of lists. Each element of the list is a list of digits. The list of digits is produced by calling the `split_digits()` function above. For example, the output produced by the following call to the function is shown below:

```
pattern_list = read_pattern("tree.txt")  
print("3.", pattern_list)  
3. [[1, 1, 1, 5, 5, 1, 1, 1], [1, 1, 1, 5, 5, 1, 1, 1], [1, 1, 5, 5, 5, 5, 1, 1],  
[1, 1, 5, 5, 5, 5, 1, 1], [1, 5, 5, 5, 5, 5, 5, 1], [5, 5, 5, 5, 5, 5, 5, 5], [1,  
1, 1, 8, 8, 1, 1, 1], [1, 1, 1, 8, 8, 1, 1, 1]]
```

7. Complete the `draw_pattern(a_canvas, pattern_list, colours, size, left, top)` (5 marks)

This function is passed **SIX** parameters: the Canvas object, a list of string elements, a list of string (colours) elements, and followed by three integer parameters. The function draws a grid of coloured rectangles inside the canvas area. The left-top position of the grid of coloured rectangles is given by the last two parameter values and the size of each rectangle is given by the size parameter. Once you have completed this function you should see rows of coloured rectangles in the canvas area.

8. Create your own pattern text file (5 marks)

Your pattern should show great preparation, creativity or effort. Submit your text file to the Assignment dropbox. Some examples are given as below:

