

EXAMINATIONS – 2021

TRIMESTER 2

COMP 132 Term Test
Programming for the Natural
and Social Sciences

Time Allowed: 50 minutes

OPEN BOOK

Permitted materials: All materials, calculators and dictionaries are permitted

Instructions: Do not spend too much time on a question if you get stuck. For example, if you have to Google for a question, do it later after you work on other questions.

Write all your answers in the template file called `TermTest.ipynb`. Write your name and student ID at the top of your file as comments.

Save your file frequently to avoid data loss.

Submit your file using our online submission system immediately after the test.

The term test will be marked out of 50.

Questions

1. If [8]
2. For loop [8]
3. String [8]
4. Numpy arrays and data visualisation [14]
5. String and word list [12]

Question 1. If**[8 marks]**

If you are caught driving over the speed limit, the amount of your infringement fine will depend on how far over the speed limit you are going.

How far over the speed limit	Infringement fine
11km/h or less	\$30
11-16km/h (exclusive)	\$80
16 or more	\$150

Define the `calculate_fine(speed_limit, speed)` function to return the amount of the infringement fine for speeding. It has two parameters: the speed limit of a road and the speed of a car. It should return zero if the speed is within the speed limit.

Test your function using the test cases given in the template file.

Question 2. For loop**[8 marks]**

Define a function to print all the COMP courses from a list of courses. The parameter is a list of course codes in which all letters are capital letters. Your function should print each COMP course on a separate line.

For example,

```
print_comp(["COMP132", "STAT193", "COMP102", "COMP103", "DATA101", "COMP261"])  
should print
```

```
COMP132  
COMP102  
COMP103  
COMP261
```

Test your function using the test cases given in the template file.

Question 3. String**[8 marks]**

Write a Python function that accepts a string as the argument, and prints out a new string that moves the first 3 characters to the end. If the length of the string is less than 4, your function should print an error message.

```
print_string("Hello")->print: loHel  
print_string("This is Mark.")-> print: s is Mark.Thi  
print_string("Hi")->print: Invalid String
```

Test your function using the examples given in the template file.

Question 4. Numpy arrays and data visualisation

[14 marks]

The template file has given you the code to import numpy and matplotlib. You need to run this cell first.

The template file also gives you a numpy array of numbers. Suppose the data is the number of books sold in each day (Mon, Tue, Wed, Thu, Fri, Sat, Sun) over two weeks.

```
data =np.array([17, 31, 16, 90, 10, 83, 25, 20, 42, 96, 30, 19, 105, 60])
```

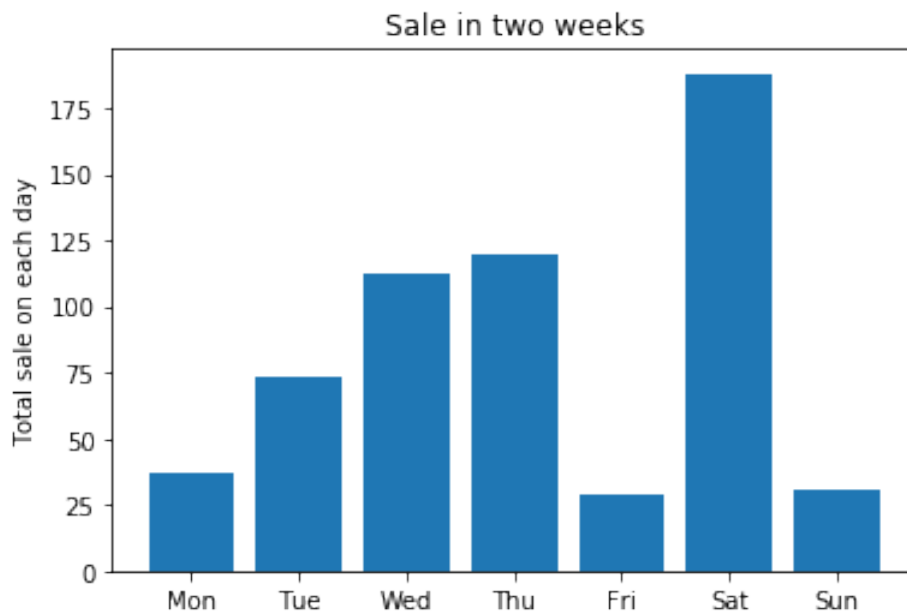
Write code to complete the tasks below.

(a) **[3 marks]** For the days where more than 50 books are sold: print out the number of sold books and the corresponding index. For example, with the data given above, the printed information should include the following, but the format can be different:

```
90 83 96 105 60
3 5 9 12 13
```

(b) **[3 marks]** Split the array into `week1` and `week2`. Find and print the total number of books sold in `week1` and `week2`.

(c) **[8 marks]** Plot the data as shown in the figure below. The x axis should show the days; y should show the total number of books sold on that day across both weeks. For example, the first bar shows that 37 books are sold on Mondays in the two weeks. Add a title and a y label to the figure.



Question 5. String and word list

[12 marks]

Define a `word.length()` function that will print the length of every word in a string specified by the parameter, and also print the longest word at the end.

For example, if the string contained the following,

```
Here is an example
```

Your function should print

```
Here 4
is 2
an 2
example 7
The longest word is: example
```

To get full marks, make sure that:

- a) If there are two or more equally longest words, it should print the last one.
- b) Your function should not count or print punctuation. You may assume that the string consists entirely of words, except for "." and "," characters, which are used as punctuation at the end of some words.
- c) Your function should only show the unique words.

For example, if the string contained the following,

```
Here are some words. Most words are short, and some words are long.
```

Your function should print

```
Here 4
are 3
some 4
words 5
Most 4
short 5
and 3
some 4
long 4
The longest word is: short
```

Please note that your word order might be different and the last longest word might also be different accordingly. It is ok as long as the words and their lengths are correct.
