National Junior College **2017 Term 2 Week 5**
SH1 Computing **Practical Revision Worksheet**

Save your work in your allocated google drive folder using the file names: T1.py, and T2.py.

1 Elisabeth would like to create a program that produces simple box-and-whisker plots. She gets you to help.

Task 1

Write the code for a function that takes in a list of real values and then prints the corresponding box-and-whisker plot.

To describe how a box-and-whisker plot is made, refer to the following example.

Suppose that we are given the values 77, 79, 80, 86, 87, 87, 94, 99. To draw the corresponding box-and-whisker plot, we must calculate the following:

- Find the min value, a = 77.
- Find the max value, e = 99
- Find the median, c = (86 + 87) / 2 = 86.5
- Form 2 sub-lists, each with values lower and higher than the median:
  - Sub-list of lower values: 77, 79, 80, 86
  - Sub-list of higher values: 87, 87, 94, 99
- Find the lower value sub-list's median, b = (79 + 80) / 2 = 79.5
- Find the higher value sub-list's median, d = (87 + 94) / 2 = 90.5

With the values a, b, c, d, and e, we then print the following box-and-whisker plot.

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Box-and-whisker plot for: 77, 79, 80, 86, 87, 87, 94, 99:

|-----|--------------|--------|-----------------|
a     b              c        d                 e

Where: a = 77, b = 79.5, c = 86.5, d = 90.5, e = 99
```

Note that following requirements as you implement this function:

- The number of "-" characters between each "|" character marker should accurately (i.e., accurate to the nearest 0.5) reflect the ratio (b – a) : (c – b) : (d – c) : (e – d).
- For all sorting, you must implement and utilise the Quicksort algorithm.

2 A certain computing teacher notices that some of her students type very slowly and decides to get them to write a program that would help to increase their typing speed.

Task 2

Write code for a script that repeats the following instructions 10 times:

- Reads the file TEXT_TO_TYPE.TXT
- Selects a random line from that file
- Prints the contents of that line to screen
- Asks the user to type out the exact string and times how long he or she takes to perform this task

Once done, the script is to then to:

- Count all the characters and words that the user has been asked to type (excluding any punctuation for the words count)
- Count the number of mistakes made in terms of the number of incorrect or missing words.
- Output the following user statistics:
    - Accuracy - percentage of correctly typed words out of all words
    - Word speed - time taken to type all words (in seconds; excluding punctuation)
    - Character speed - time taken to type all characters (in seconds)
    - On average, the 20 slowest characters typed (note that the time taken to type a character is the time interval from the last character typed – i.e., the character typed just before the target character – till the time taken to type the target character; the mean calculated should exclude the first character typed for each string tested.