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| Programme of Study: | MSc in Cloud Computing |
| Module: | Infrastructure as Code |

Please refer to the Institute’s Quality Assurance Handbook, Version 3.0, September 2018

1. Practical work, forming part of the CA of a module, will only be assessed if the student has attended the relevant practical classes.
2. CA work must be completed within the schedules and specifications (specified in the CA brief). Students who submit CA late may forfeit some or all the marks for that work.
   1. The total marks available for an assessment be reduced by 15% for work up to one week late.
   2. The total marks available be reduced by 30% for work up to two weeks late.
   3. Assessment work received more than two weeks late will receive a mark of zero.

Work is deemed late when an unauthorised missing of a deadline has occurred.

1. CA must be the student’s own work, refer to Plagiarism Policy, in section 5.7 of the QA manual.

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# Description

This lab report describes the practical work which was carried out in week 1, 2 and 3 of the Infrastructure as Code module. The practical work had been primarily conducted at the ATU computer lab however, it was then redone from scratch on the student’s laptop. Software such as Notepad++, Python and Visual Studio Code had been installed on the student’s laptop. In Week 1, most of the introductory exercises were carried out. In Week 2, the student had started to do code by starting with data structures, assignment and variables and documentation. In Week 3, the student had started with functions, loops modules and packages.

# Aims

The section below describes the aims of the practical work as of week 1, 2 and 3.

1. Installation and setup of Notepad++, Python and Visual Studio Code.
2. Completion of exercises in Walkthrough -1. Assignment and Variables
3. Completion of exercises in Walkthrough -2. Documentation
4. Completion of exercises in Walkthrough -3. Data Structures
5. Completion of exercises in Walkthrough -4. Loops and Statements
6. Completion of exercises in Walkthrough -5. Functions
7. Completion of exercises in Walkthrough -6. Modules and Packages

# Methodology

This section depicts the methods used to achieve the aims listed in the previous section. For aim number 1, the student had referred to the lecturer’s notes in order to install Notepad++ [1], Python [2] and Visual Studio Code [3].

For aim number 2, the student had referred to the lecturer’s notes [4] in order to complete the exercises in Walkthrough -1. Assignment and Variables.

For aim number 3, the student had referred to the lecturer’s notes [5] in order complete the exercises in Walkthrough -2. Documentation.

For aim number 4, the student had referred to the lecturer’s notes [6] in order to complete the exercises in Walkthrough -3. Data Structures.

For aim number 5, the student had referred to the lecturer’s notes [7] in order to complete the exercises in Walkthrough -4. Loops and Statements.

For aim number 6, the student had referred to the lecturer’s notes [8] in order to complete the exercises in Walkthrough -5. Functions.

For aim number 7, the student had referred to the lecturer’s notes [9] in order to complete the exercises in Walkthrough -6. Modules and Packages.

# Results and Testing

This section depicts the results and testing which was carried out by the student based on the methodology.

For aim number 1, the student had referred to the lecturer’s notes in order to test the installed Notepad++ [1], Python [2] and Visual Studio Code [3] software and the results were as stated in the lecturer’s notes.

For aim number 2, the student was able obtain the answers as per stated in the lecturer’s notes [4].

For aim number 3, the student was able obtain the answers as per stated in the lecturer’s notes [5].

For aim number 4, the student was able obtain the answers as per stated in the lecturer’s notes [6] but there was an error. There was a minor error in the lecturer’s code as the letter “I” in “Iterable” was not standardised. The student was able to obtain the expected result by using the upper case “I” for the word “Iterable”.

For aim number 5, the student was able obtain the answers as per stated in the lecturer’s notes [7].

For aim number 6, the student was able obtain the answers as per stated in the lecturer’s notes [8].

For aim number 7, the student was able obtain the answers as per stated in the lecturer’s notes [9].

# Conclusions

This section describes the take away points from week 1, 2 and 3 of the practical work which had been conducted by the student. All of the aims mentioned above had been met as the student was able to complete all of the exercises.

As for aim number 1, prior to the installation of Visual Studio Code, the student was using Notepadd++ as the primary source code editor. Using Notepad++ can be somewhat cumbersome as it does not have a built-in terminal as the Visual Studio Code. Besides that, Visual Studio Code is as fast as Notepad++ which allows it to produce the output within milliseconds.

As for aim number 2, to summarize, python is a programming language which allow the student to create variables just by assigning an individual value to the variable. This can be done without even declaring the variable in advance. The variable type is determined by the value which is assigned to the variable. Specific types of class constructors such as float() or int() can be used to assign values if the student would like to control the type of the assigned variable. Students independent research [10] indicates that python variables do provide a dynamic and simple method in order to create variables, nevertheless they also uphold a robust type of system which ensures very safe operations of the data which is input.

As for aim number 3, comments and documentation are vital for the codes which are developed because it allows other to understand the complicated codes which is written by the coder. Besides that, it also allows the coder to refer back to their own set of complicated codes in the future and understand it doubtlessly. The student’s independent research [11] indicates that, regardless of how good a software is, people will not use it if the documentation is not good enough. This is because the documentation provides a clear view of what the code can do. As for the types of commenting, it is always good to sue the comments (using #) mainly to explain how a set of code works. Docstrings (using “””) can be mainly used to document about modules, classes and functions.

As for aim number 4, to summarize, data structures are typically the fundamental constructs which is used to develop programs and codes. Each and every data structure represents a specific way of categorizing/organizing a set of data which can then be accessed efficiently based on the use. The student’s independent research [12] indicates that the naming conventions used in python does not provide the similar level of clearness which can be found in other languages. For example, In JAVA, a list can be indicated as an ArrayList or a LinkedList to abolish the ambiguity however, this is not really available in python. Sometimes, even the python coders with years of experience might be confused whether the type of built-in list in a set of code is implemented as a dynamic array or a linked list.

As for aim number 5, to summarize, for loops help to simplify complicated problems into simpler forms. In the event of needing to create a set of code which prints the initial 10 similar numbers, loops can be used to run several iterations and identify the 10 initial similar numbers rather than to use the print statement 10 times over and over again. Loops also allow elements of data structures such as the array or linked lists to be traversed over. Indentations in loops provide more clarity to understand the situation. Indentation is similar to reading a book with the aid of page numbers. This is because the page numbers in the book will indicate the sequence of the pages. Without proper indentation, python will not be able to know which statement to execute next and this will cause the “IndentationError” to occur. Besides that, using scan to iterate a dictionary will result in an error. This is because a dictionary cannot be unpacked using scan. Instead, scan.items() can be used to iterate a dictionary.

As for aim number 6, to summarize, functions in python are basically a smaller set of code which is independent from the other code. Building smaller functions enables to call the smaller ones at any time in a program and also to build large programs which consists of smaller functions. Lambda functions are basically python’s way of implementing anonymous functions. Student’s independent research [13] indicates that lambda functions enable to create anonymous functions which can be considered as single-use versions of the normal functions which will be then passed over to higher order functions. A lambda function can be best used in a filter or map because it is able to support compact codes.

As for aim number 7, to summarize, modules can be considered as similar to the libraries which are possibly user defined or perhaps downloaded through the pip. Modules also enable to utilize the functionalities which is defined in another file. From a bird’s eye level of view, modules allow to solve complex tasks easily by grouping or organizing the set of code and it can be fetched only when it is needed.

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