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| **Programming 1 (PRG1)**  Diploma in IT / DS / CSF / IM / CICTP  Year 1 (2023/24) Semester 1 | Week **1** |
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| **Activities : Problem Solving using Computers** | |

**OBJECTIVES**

At the end of this exercise, students should be able to:

* Work out a solution to a problem
* Express algorithms using pseudocodes
* Understand the concepts of variables, data types, operators and expressions

**IMPORTANT**

* Create a folder, **Week01**, on your hard disk.
* Save this word document as **Week01-YourName.docx** in the **Week01** folder created above.
* For each question, type your answer into the box provided below the question.
* For the questions that require you to write Python program, create the Python program with the given file name in the **Week01** folder created above, then copy and paste the programs into the box below the respective question
* Do add the description, your name and student ID as comments at the beginning of each program.
* At the end of the session, save this word document and submit it in POLITEMall.

**PART 1**

Activity 1

State the input, process and output needed to solve the following problem:

- Calculate the annual income for an executive employee.

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| Input | User need to input monthly salary for employee, User need to input annual bonus if applicable |
| Process | Formula for Annual Income is Monthly Salary x Total Months in a Year (12 months) + Annual Bonus if any  Calculate Annual Income based on input |
| Output | Total Annual Income is displayed |

Activity 2

Write the pseudocode for the problem:

- Calculate the annual income for an executive employee.

Pseudocode:

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| Prompt for Monthly Salary  Get monthly salary  Prompt for annual bonus Get annual bonus Calculate annual income = 12 \* monthly salary + annual bonus Display total annual income  Actual Code: [this is additional challenge in class] ms = float(input(‘Enter your monthly salary: ‘)) b = float(input(‘Enter your annual bonus if applicable: ‘)) ai = ms + b print(‘Your annual income is: ' +str(ai)) |

**PART 2**

Activity 1

What is the data type of each of the following expressions (within the type function)?

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| Program Text |  | Output |
| >>> print(type(7)) |  | Int |
| >>> print(type("Welcome")) |  | str |
| >>> print(type(False)) |  | bool |
| >>> print(type(7.5)) |  | float |
| >>> print(type(12/17)) |  | float |
| >>> print(type(2.0/1)) |  | float |
| >>> print(type(11 \*\* 3)) |  | Int |
| >>> print(type(2 == "2")) |  | bool |
| >>> a = str((-4 + 3 / 2 \*\* 3) + 321 - ((64 / 16) % 4) \*\* 2)  >>> print(type(a)) |  | str |

Activity 2

Write a program (Hip.py) to display "Hip Hip Hurray" 2 times followed by "Welcome to ICT" 3 times, on individual lines.

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| Sample output |  |

Python Code:

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| print('Hip Hip Hurray Hip Hip Hurray')  ict = 'Welcome to ICT'  print(ict)  print(ict)  print(ict) |

Activity 3

Given that the price of an item is $250 and the gst is 8%, calculate and display the total cost of the item.

* State the input, processing and output needed to solve the problem.
* Develop pseudocode to calculate and display the total cost of the item.
* Write a Python program (TotalCost.py) to solve this problem based on the pseudocode developed.

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| Input | User need to input price of item |
| Process | Formula for total cost of item is Price of Item x 1.08  Calculate total cost of item with input |
| Output | Total price of item inclusive of 8% GST is displayed |

Pseudocode:

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| Prompt for Price of Item -> Get price of item -> Calculate Total cost of item = Cost if item \* 1.08 -> Display total cost of item |

Python Code:

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| # This programme is to calculate the total cost of an item inclusive 8% GST  poi = float(input('Enter your item price in $SGD: '))  gst = poi \* 1.08  print('Your total item price is: ' + str(gst) + 'SGD') |

Activity 4

The final mark for PRG1 module is calculated based on 30% of common test, 30% of assignment and 40% of continuous assessment.

* State the input, processing and output needed to solve the problem
* Develop a pseudocode to calculate and display the final mark of the module. You may assign continuous assessment 75, assignment 80 and common test 60
* Write a Python program (MarkCalculator.py) to solve this problem based on the pseudocode developed.

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| Input | User need to input marks for common test, for assignment and for continuous assignment |
| Process | Formula for final mark of PRG1 module is [ 0.3(Common Test) + 0.3(assignment) + 0.4(continuous assignment) ]  Calculate the final mark using input |
| Output | Final mark of PRG1 is displayed |

Pseudocode:

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| Prompt common test mark -> Get common test mark -> Prompt assessment mark -> Get assessment mark -> Prompt continuous assessment mark -> Get continuous assessment mark -> Calculate Final Mark for PRG1 -> Display Final Mark for PRG 1 |

Python Code:

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| # This programme is to calculate the final mark of PRG1 Module  ct =float(input('Enter your common test mark: '))  a = float(input('Enter your assignment mark: '))  ca = float(input('Enter your continous assessment mark: '))  fm = 0.3 \* ct + 0.3 \* a + 0.4 \* ca  print('Your final mark for PRG1 is: ' +str(fm)) |