Worksheet 1

Question 1

Write the pseudo-code for a program that:

- Continuously ask the user to enter a number and terminate when the user enters -999
- At the end of the input phase, the program should print
  - The total of the numbers inputted
  - How many numbers were greater than 0
  - How many numbers were less than 0

[9 marks]

Question 2

A year ten student's end-of-term grade is calculated as an average of 4 tests during the term. Write the pseudocode for a program that:

- Asks the user to enter their scores for these four tests
- Validate each user input – valid test scores are between 0 and 100 inclusive
- Calculate the average and display this on the screen
- Print a message stating whether the student passed or fail. An average of 70 and above is a passing grade

[9 marks]

Question 3

Write a pseudo-code program asking the user to enter their age. The program should then display “you are a child” if the age is 3–12, “you are a teenager” if the age is 13–19, or “you are an adult” if the age is greater than 19.

[5 marks]

Question 4

Write a program for the pseudocode that asks the user to enter their password. The program should keep asking the user until the correct password is entered. Assume we have a variable called **password** that stores the **"computer"** as the password.

[5 marks]

Question 5

Write the pseudo-code for a program that asks the user to enter two numbers. The program should then display the following message:
"What would you like to do?"
1) Addition
2) Subtraction
3) Multiplication

The program should then carry out the chosen operation and print the result.

[7 marks]

Question 6

The following subroutine, called **largest**, is defined to take three parameters. Complete the subroutine so that it returns the largest of the three values.

```
SUBROUTINE largest(a, b, c)
    largest ← a


    _____________________________________


    _____________________________________


    _____________________________________


    _____________________________________


    _____________________________________


    _____________________________________


    _____________________________________
    RETURN largest
ENDSUBROUTINE
```

[5 marks]

Question 7

Develop a pseudo-code algorithm that checks if the user has entered a string representing a valid hexadecimal number.

A hexadecimal number is valid if it contains precisely four characters and all those characters are in the range '0' to '9' or 'A' to 'F'.

The algorithm should:

- prompt the user to enter a 4-character hexadecimal number and store it in a variable
- check that the number only contains the characters '0' to '9' or 'A' to 'F'
- check that the number is exactly four characters long
- output 'ok' when the number is valid; otherwise, it should output 'wrong'.

For example:

- if the user enters the string '1A2F', it should output 'ok'
- if the user enters the string '1A2', it should output 'wrong'
- if the user enters the string '1G2H', it should output 'wrong'.

[9 marks]

Question 8

Consider the following code:

```
m ← False
n ← True
IF NOT (m OR n) THEN
   OUTPUT 'P'
   IF NOT((NOT m) AND (NOT n)) THEN
      OUTPUT 'Q'
   ELSE
      OUTPUT 'R'
   ENDIF
ELSE
   OUTPUT 'S'
   IF (NOT m) OR (NOT n) THEN
      OUTPUT 'T'
   ELSE
      OUTPUT 'U'
   ENDIF
ENDIF
```

State the output from the algorithm shown in the code above.

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[2 marks]

Question 9

Develop an algorithm using pseudo-code that:

- Initialises a variable called **prodValid** to False
- Sets a variable called **prodValid** to True if the string contained in the variable **prod** is an uppercase **P** followed by the character representation of a single uppercase letter (A-Z).

Examples:

- if the value of prod is **PZ** or **PA**, then **prodValid** should be True
- If the value of prod is **pB** or **P7**, then **prodValid** should be False

You can use the subroutine **isUppercase(ch)** in your answer. The subroutine **isUppercase** returns True if the character parameter **ch** is an uppercase letter and False otherwise.

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[3 marks]

Question 10

Develop an algorithm, using either pseudo-code, that assists a hot chocolate vendor in a cold region in projecting how many cups of hot chocolate they will sell on a particular day. Your algorithm should:

- get the user to enter whether it is a holiday or a regular day
- get the user to enter the temperature forecast in degrees Celsius (they should enter a number between -10 and 20 inclusive; if the number falls outside of this range, then they should be made to re-enter another number until they enter a valid temperature)
- Determine the number of hot chocolates that are likely to sell based on the following:
    - 80 cups are likely to be sold if the temperature is between 10 and 20 degrees inclusive,
    - 100 cups are likely to be sold if the temperature is between 0 and 9 degrees inclusive,
    - 150 cups will likely be sold if the temperature falls below 0 degrees.

- increase the prediction by 50% if it is a holiday
- display the projected number of cups of hot chocolate that are likely to be sold.

[9 marks]