National 5 Computing Homework

Computational Thinking

Topic 4 - IF (Making Decisions)

Name -

Grade - / 28

Feedback

Without the ability to make decisions a computer program would not be able to change how it responds to input. Conditions (for example - num>=25) are used to decide how the program will respond.

In the following questions you will be asked to predict what the output from each program will be from a variety of different inputs.

Example program:

```
number = int(input("Please enter an integer"))
if number < 10:
    print("Low")
if number >= 10 and number <= 20:
    print("Middle")
if number > 20:
    print("High")
```

#indented lines are only if the above condition is true

a)

Input Entered	Output from Program
3	Low

b)

Input Entered	Output from Program
12	Middle

c)

Input Entered	Output from Program
20	Middle

d)

Input Entered	Output from Program
27	High

Program 1:

```
number = int(input("Please enter an integer"))
if number <= 50:
    print("Low")
if number > 50 and number < 100:
    print("Middle")
if number >= 100:
    print("High")
```

1.

Input Entered	Output from Program	
23		**(1)**

2.

Input Entered	Output from Program	
67		**(1)**

3.

Input Entered	Output from Program	
100		**(1)**

4.

Input Entered	Output from Program	
236		**(1)**

5.

Input Entered	Output from Program	
50		**(1)**

Program 2:

```
temp = float(input("Please enter a temperature"))
if temp >= -273 and temp <= 12:
    print("Solid")
elif temp >13 and temp < 47:                    #elif in Python means 'else if'
    print("Liquid")
elif temp >= 47:
    print("Gas")
else:                                           #if none of the conditions above
    print("Not Found")                            are true, the 'else' is used
```

6. Input Entered: -12 → Output from Program **(1)**

7. Input Entered: 47 → Output from Program **(1)**

8. Input Entered: 13 → Output from Program **(1)**

9. Input Entered: 55 → Output from Program **(1)**

10. Which of the above questions (5,6,7 or 8) highlights an error in the logic of the program? **(1)**

_____

State how would you fix the program? **(1)**

_____

Program 3:

```
age = int(input("Please enter your age"))
if age < 0 or age > 120:                        #with an 'or' only one
    print("Age not valid")                        condition has to be true
elif age >= 0 and age <= 18:
    print("School age")
elif age >= 16 and age <= 70:
    print("Working age")
elif age > 65:
    print("Retirement age")
else:
    print("Not Found")
```

Note - for this program there may sometimes be two outputs generated from the one input.

11. Input Entered: 15 → Output from Program **(1)**

12. Input Entered: -1 → Output from Program **(1)**

13. Input Entered: 18 → Output from Program **(1)**

14. Input Entered: 70 → Output from Program **(1)**

15. Assuming an integer is entered as input, explain why can the output never be "Not Found"? **(1)**

_____

_____

It's possible to put 'if' statements inside each other. In programming, this is called nesting.

Example program:

```
test = int(input("Please enter an integer"))
if test >= 0 and test <= 12:                    #outside if statement
    print("outside")
    if test >= 0 and test < 4:                  #nested if statement
        print("inside")                         #two levels of indentation
```

The conditions of a nested if are only checked if the outside if conditions are true:

Input Entered	Output from Program
3	outside inside
7	outside

Program 4:

```
percentage = int(input("Please enter a percentage between 0 and 100"))
if percentage < 0 or percentage > 100:
    print("Invalid Input")
elif percentage >= 0 and percentage < 100:
    print("Valid Percentage Entered")
    if percentage >= 0 and percentage < 50:
        print("Fail")
    elif percentage >= 50 and percentage < 60:
        print("C Pass")
    elif percentage >= 60 and percentage < 70:
        print("B Pass")
    else:
        print("A Pass")
```

16. Input Entered: 110 → Output from Program: **(1)**

17. Input Entered: 55 → Output from Program: **(1)**

18. Input Entered: 34 → Output from Program: **(1)**

19. Input Entered: 79 → Output from Program: **(1)**

20. Input Entered: 60 → Output from Program: **(1)**

21. Input Entered: 50 → Output from Program: **(1)**

Program 5: The following program calculates the postage cost of parcels depending on their value and their weight.

```
value = float(input("Please enter the value of your item"))
weight = float(input("Please enter the weight of your item in kilograms"))
if value <= 0:
    print("Invalid value")
    postage = 0
if weight >= 0 and weight < 2:
    if value > 0 and value < 50:
        postage = 1.50
    if value >= 50 and value < 150:
        postage = 2.75
    if value >= 150:
        postage = 5.50
elif weight >= 2 and weight < 10:
    if value > 0 and value < 50:
        postage = 2.50
    if value >= 50 and value < 150:
        postage = 4.40
    if value >= 150:
        postage = 8.35
elif weight >= 10 and weight < 25:
    if value > 0 and value < 50:
        postage = 7.55
    if value >= 50 and value < 150:
        postage = 12.30
    if value >= 150:
        postage = 15.00
else:
    postage = 25
print(postage)
```

Calculate the postage for each of the inputs entered in the program.

22. Value = 62
Weight = 1.5
Postage = _____ **(1)**

23. Value = 0
Weight = 2.2
Postage = _____ **(1)**

24. Value = 172
Weight = 19
Postage = _____ **(1)**

25. Value = 250
Weight = 32.5
Postage = _____ **(1)**

26. Value = 34
Weight = 2.5
Postage = _____ **(1)**

27. Value = 50
Weight = 10
Postage = _____ **(1)**