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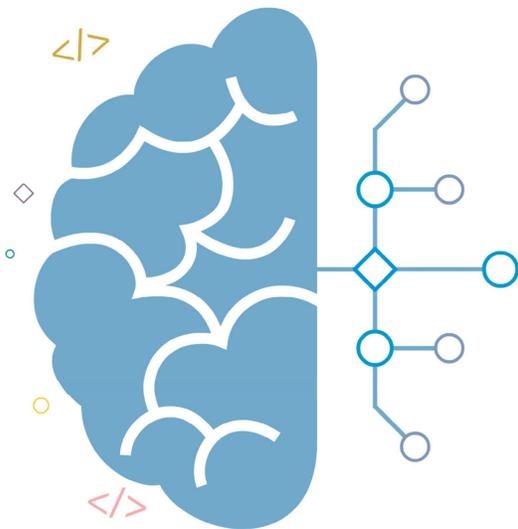
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UNIT 2

Conditional statements
and flow control



Conditional statements



Designing simple conditional statements



Design simple conditional statements using relational operators for the cases in the table.

State if the result of your simple conditional statement is true or false. Use the variables: **kByte = 1000**, **mByte = 1000000** and **gByte = 1000000000**

Table 3

Question	Simple conditional statement	True or False
Is kbyte equal to 12 bits?	<code>oneByte == 12</code>	False
Is a kbyte less than 500 bytes?		
Is a mbyte not equal to 0?		
Is gbyte the same as mbyte ?		
Is kbyte greater than or equal to 0?		
Is mbyte less than or equal to 1000?		



Questions for simple conditional statements



Look at the **simple conditional statements** in the table below showing some distances from Sharjah. Examine what the code checks and write it as a question. Use the variables:

```
distFujairah = 111
```

```
distAbudhabi = 171
```

```
distAlmirfa = 291
```

Table 4

Simple conditional statements	Question
<code>distAbudhabi > 3</code>	Is the distance to Abu Dhabi greater than 3?
<code>distFujairah < distAlmirfa</code>	
<code>distAbudhabi == 314</code>	
<code>distFujairah != distAlmirfa</code>	



Writing compound conditional statements

Write the compound conditional statement for the questions in the table. Use the following variables: `sidesSquare = 4`, `sidesTriangle = 3`, `sidesPentagon = 5`.

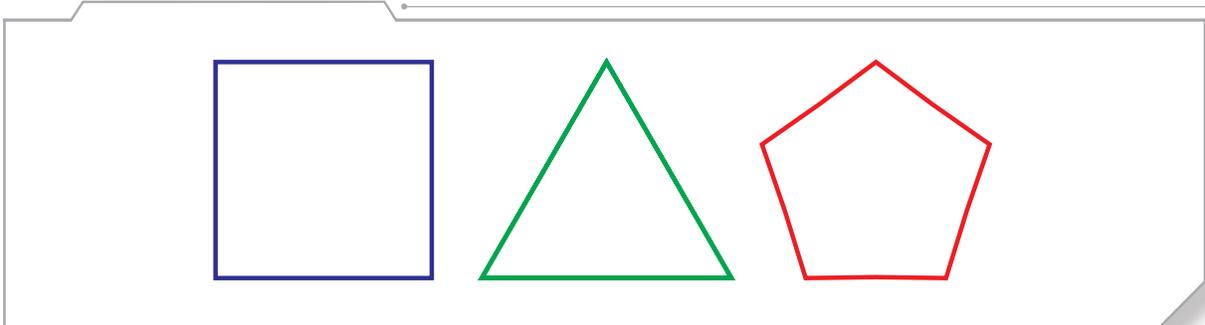


Table 8

Question	Compound conditional statement
Is the number of sides for a square the same as 6 or is the number of sides of a triangle bigger than 2?	<code>(sidesSquare == 6) or (sidesTriangle > 2)</code>
Are the sides of a pentagon more than 5 and are the sides of a square the same as 5?	
Are the sides of a triangle more than 2 and smaller than 19?	



Results of compound conditional statements



(a) State the result of each compound conditional statement in the table.

Table 9

Compound conditional statement	True or False
<code>(sidesSquare == 4) or (sidesTriangle > 5)</code>	
<code>(sidesPentagon > 4) and (sidesPentagon < 10)</code>	
<code>(sidesSquare > sidesTriangle) or (sidesTriangle > sidesPentagon)</code>	

(b) Then set the following variables in Python: `cars = 2`, `buses = 3` and `scooters = 3`.



(c) Finally, check your answers in Python.

Table 10 - Evaluating compound conditional statements

Compound Conditional Statement	Result	PyCharm result
<code>(cars > 4) and (buses < 48)</code>	False	False
<code>(scooters == 3) or (cars == 2)</code>		
<code>not((cars != 4) and (buses == 3))</code>		

Flow control



The if statement

(a) Complete the `if` statement.

```
june = 30  
may = 31  
__ may > june __  
  
print("There are more days in May.")
```

(b) State the results without running the code.

```
170  
171 #program to check if you can get a driving  
172 age = input("Please enter your age:")  
173 age = int(age)  
174  
175 if age > 17:  
176     print("You can get a driving licence now.")  
177     print("Go and apply for at the nearest driving school.")  
178
```

Will the code block be run or skipped if you enter `age = 17`? Why?

(c) Will the code block be run or skipped when you enter **age = 18**? Run the code and state what happens.

(d) Will the code block below the **if** be run or skipped when you enter **age = 19**? Run the code and state the results.



Using conditional statements

You will now test compound conditional statements with the `if` statement.

```
157 #Program to check if a student is in cycle 2
158 grade = input("Please enter your grade: ")
159 grade = int(grade)
160 if grade > 5 and grade < 9:
161     print("Grade:", grade, "is cycle 2.")
162
```

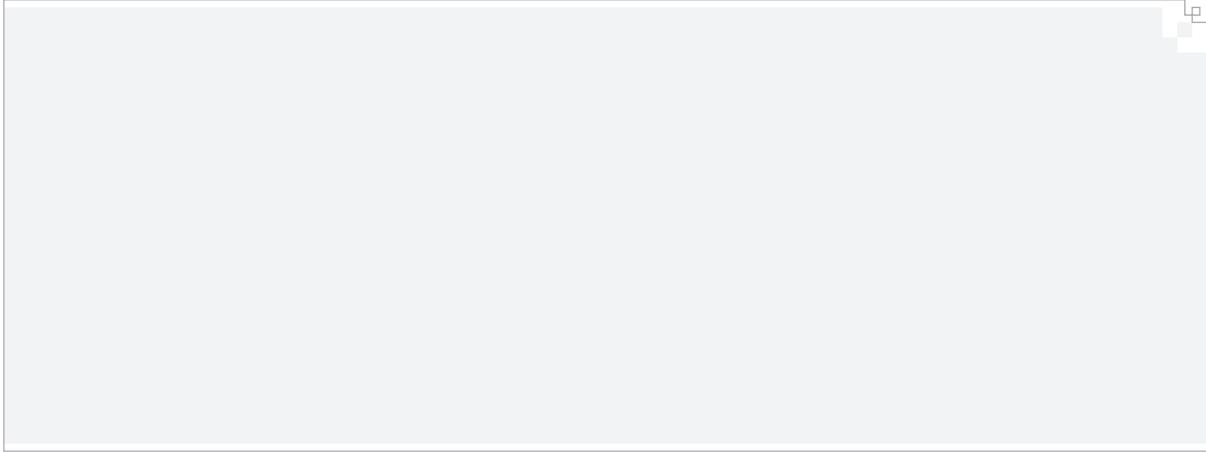
(a) Will the code block be run or skipped when you enter `grade = 2`?

Run the code and state the results.

(b) What will happen you enter `grade = 7`?

Run the code and explain your results.

(c) Will the code block be run or skipped when you enter **grade = 10**? Run the code and explain your results.





Using if statements

(a) Write a program to check if the number entered is positive. Your code should print a statement saying that a positive number was entered. It should do nothing if the number is not positive.



The difference between the if and the if-else statements

(a) Compare the Python code you designed in activity 17(a) to the program below. Test the program with 100 and -100.

State your result.

```
136 # Program to check if the number entered is positive
137 number = input("Please enter a number: ")
138 number = int(number)
139 if number > 0:
140     print("Number ", number, " is positive")
141 else:
142     print("Number ", number, " is negative")
```



Using the if-else statement



(a) Design a Python program that inputs student marks between 0 and 100. These are the marks achieved by grade 10 pupils on a Computer Science exam. Your program should then print **'Passed'** if the mark is above 60 or **'Failed'** if the mark is less than or equal to 60.



Using selection - the elif statement

(a) Which statement is needed for the cases below? Tick the correct box.

Table 11

Case	if Statement	if-else Statement	elif Statement
Show an elevator overload message depending on the weight of the passengers.			
Turn the pedestrian crossing light to green or red depending on the press of a button.			
Show a notification on the messaging app logo if a new message is received.			
Decide whether to go to YouTube's main website or the YouTube Kid's website based on age.			
Show an error message only when a user enters a wrong password on a sign-in form.			
Decide whether a passenger in the airport pays extra luggage charges or not.			

(b) Design a Python program to print a comment based on a student's mark. The user should enter the marks. Test your code for marks from every range.

Table 12

Mark range	Message
Less than 0 or greater than 100	Wrong grade
Greater than or equal to 0 and less than 40	ok
Greater than or equal to 40 and less than 50	good
Greater than or equal to 50 and less than 75	Very good
Greater than or equal to 75 and less than or equal to 100	Excellent

Repetition



Use the code below to answer the questions

```
1 total = 0
2
3 while total < 10:
4     num = input("Enter a number:")
5     num = int(num)
6     total = total + num
7
8 print("Total is: ", total)
```

(a) Run the code and enter 1 each time you are asked to enter a number.

- ❖ How many times are you asked to enter a number?
- ❖ How many times did the while loop run?
- ❖ Why did it stop?

(b) Now enter 2 each time you are asked to enter a number.

- How many times are you asked to enter a number?
- How many times did the while loop run?
- Why did it stop?

(c) Now enter 5 each time you are asked to enter a number.

- ❖ How many times are you asked to enter a number?
- ❖ How many times did the while loop run?
- ❖ Why did it stop?

(d) Now enter 23 each time you are asked to enter a number.

- ❖ How many times are you asked to enter a number?
- ❖ How many times did the while loop run?
- ❖ Why did it stop?

Conditional statements are very important when you design while loops. The code inside the while loop will repeat for as long as the condition is true.



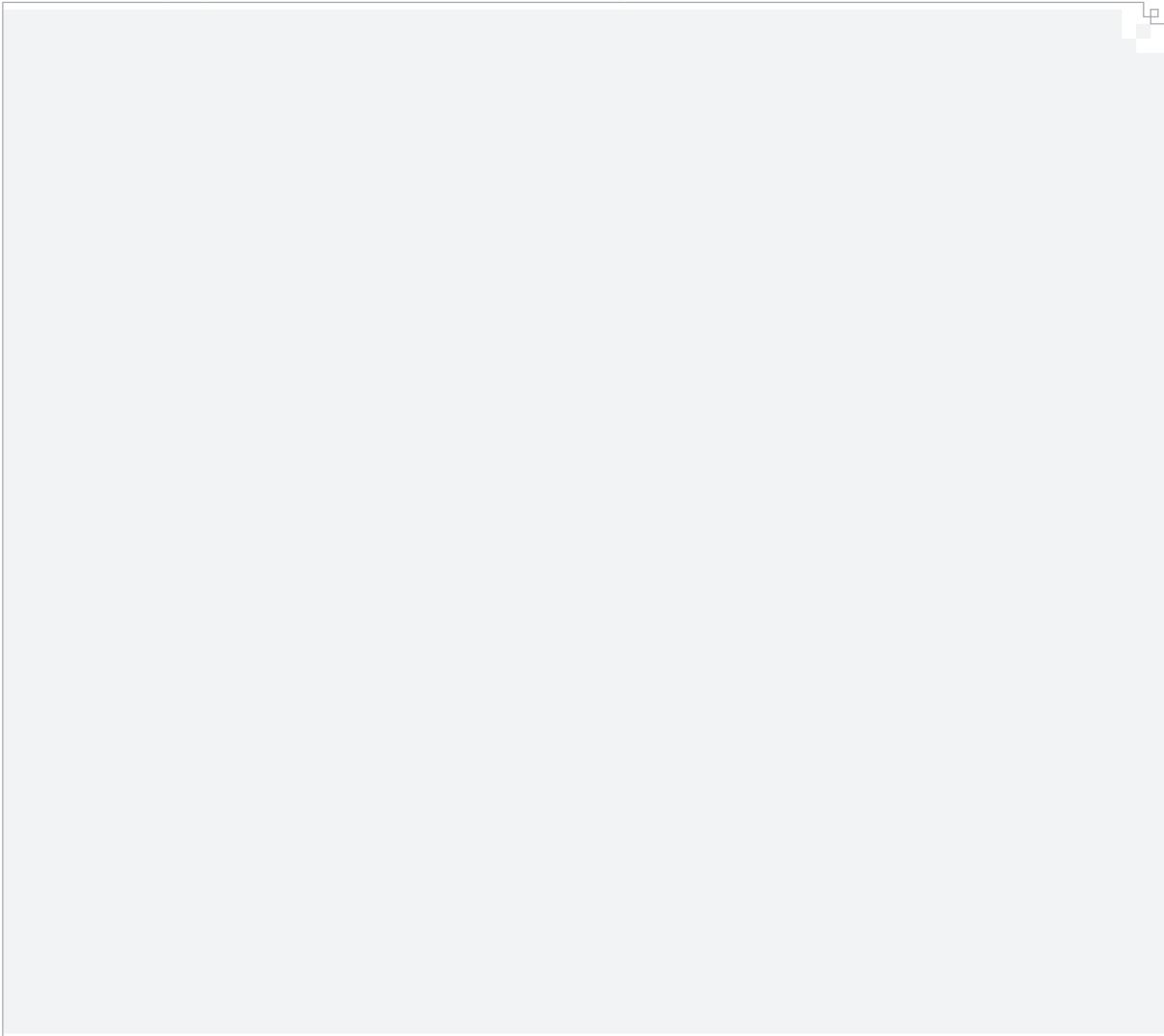
Using while loops

(c) Design a program to print the following menu:

Super Maze Game

1. Enter the maze.
2. Choose a level.
3. Exit game.

It should display this menu all the time and only exit when the user enters 3.





Using for loops



```
1  #Do I need to go to school today?  
2 for Day in 1, 2, 3, 4, 5:  
3     print("Wake up and go to school")  
4  
5 print("I miss school.")  
6
```

(a) Run the program above and answer the following questions.

- ❖ How many times is the 'Wake up' message printed?
- ❖ How many times is the 'I miss school' message printed? Why?

Unit 2 Conditional statements and flow control

(b) You used the `Day` variable as a loop counter only. You can use this variable in the code block under the `for` loop.

```
1 #Do I need to go to school today?
2 for day in 1, 2, 3, 4, 5:
3     print("Today is: ", day)
4     print("Wake up and go to school")
5
6 print("I miss school.")
```

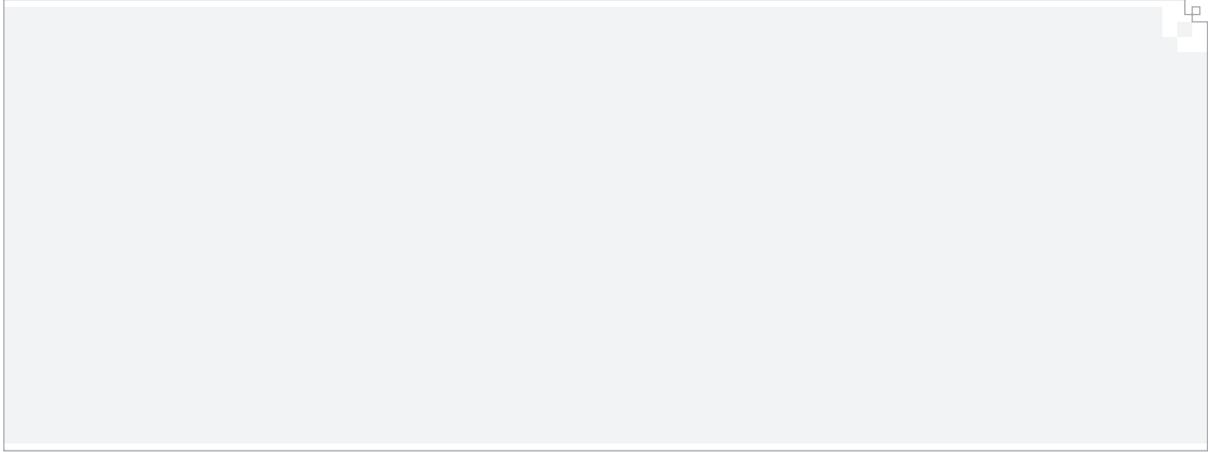
Run the code and explain where the number for the day is coming from.

You can use the counter variable in calculations as part of the `for` loop.

You can add code to calculate how many hours you have spent in school. The code below assumes that you spend 5 hours in school each day.

```
1 # Do I need to go to school today?
2 HoursInSchool = 0
3
4 for Day in 1, 2, 3, 4, 5:
5     print("Today is:", Day)
6     print("Wake up and go to school")
7     HoursInSchool = Day * 5
8     print("We have spent", HoursInSchool, "hours in school.")
9
10 print("I miss school.")
```

(c) State the results.





Using range()

```
1  for num in range(1,5,1):  
2     print ("Iteration number: ", num)  
3
```

(a) Run the code. How many lines are printed? Why?

(b) What do you need to do to print 5 lines? Change the code.

(c) Change the 5 to 100. What happens when you run the code?



State the output

(a) State the outputs from a for loop written using the ranges below.

```
1  for num in range(1,5,1):  
2     print ("Iteration number: ", num)  
3
```

Table 13

Range	Output
<code>range(0, 5, 1)</code>	0, 1, 2, 3, 4
<code>range(0, 15, 1)</code>	



Khalifa Fund for Enterprise Development – Main menu

Design the part of your program to print the main menu for a user. The user should be able to enter their choice.

Print a welcome message when the user enters a choice.

Exit the program when option 4 is entered.

THE KHALIFA FUND

1. Income
2. Spent
3. Balance
4. Exit

1. Project description

2. Project design (sketch, flowcharts, description, Mind Map, pseudocode, etc.)

3. What went well?

4. How could you make your program better?

Project checklist

Have you completed the following?

Task	Done?	Comment
1. Printed the main menu		
2. Users can enter a choice		
3. A welcome message is printed		
4. Users can exit the program		

Project marks

Task	Total Marks	Actual Marks	Comment
1. Project description			
2. Planning			
3. Project implementation			
4. Testing			
5. Evaluation			
Total marks			



Khalifa Fund for Enterprise Development – Main menu

Design the part of your program to print the main menu forever until the user enters option 4.

THE KHALIFA FUND

1. Income
2. Spent
3. Balance
4. Exit

1. Project description

2. Project design (sketch, flowcharts, description, Mind Map, pseudocode, etc.)

3. What went well?

4. How could you make your program better?

Project checklist

Have you completed the following?

Task	Done?	Comment
6. Printed the main menu		
7. The main menu is printed again after a user enters a choice		
8. Users can exit the program		

Project marks

Task	Total Marks	Actual Marks	Comment
1. Project description			
2. Planning			
3. Project implementation			
4. Testing			
5. Evaluation			
Total marks			



End of unit activities

1. Design a Python program to add all the numbers from 1 up to the number entered by a user. If a user enters 5, then your program should carry out the addition: $1 + 2 + 3 + 4 + 5$ and print the answer.

2. Design a Python program to print the multiplication table for the number passed to it from 1 up to 5. For example, if a user enters 4, your program should print the answers to 4 times all the numbers from 1 to 5.

```
1 x 4 = 4
2 x 4 = 8
3 x 4 = 12
4 x 4 = 16
5 x 4 = 20
```

3. What is the best loop to use for the problems below?

Table 14

Case	While	For
1. Asking the user to enter their email until it is a valid email		
2. Printing all even numbers from 1 to 5000		
3. Calculating your final score by adding up your grades in all the ten subjects you study		
4. Showing a menu to a user where they can select an item or exit the program		



Student reflection

1. List three things you have learned.

2. Describe two skills that you can do on your own.

3. ✓ Tick it if you can do it.

Write simple conditional statements.

Write compound conditional statements.

Use comments in your programs.

Design a program using if or if-else or if-elif-else statements.

Design a computer program with a while loop.

Design a computer program with a for loop.