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NGEE ANN
SCHOOL OF INFOCOMM TECHNOLOGY

Selection Structure
Compound Conditions

Programming I (PRG1)

Diploma in Information Technology
Diploma in Financial Informatics
Diploma in Cybersecurity & Digital Forensics
Common ICT Programme
Year 1 (2019/20), Semester 1

Objectives

At the end of this lecture, you will understand

- Compound Conditions

Compound Conditions

Compound Conditions

- **Recall:**

  Compound conditions can be constructed using logical operators.

Logical Operator	Example
and	x > y and x > z
or	x != y or x != z
not	not (x == y)

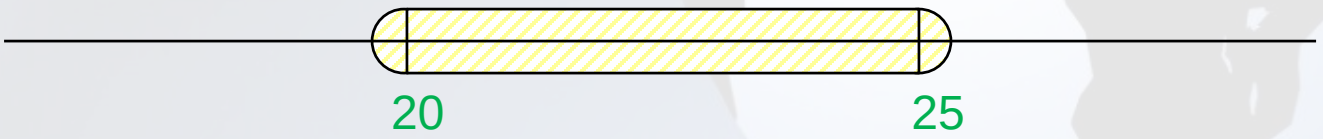
Logical AND Operator

- To check whether the value in the variable temperature is between 20 and 25 inclusively:

(temperature >= 20) and (temperature <= 25)

or

20 <= temperature <= 25



Logical OR Operator

- To check whether the value in the variable temperature is smaller than 20 or larger than 25 :

(temperature < 20) or (temperature > 25)

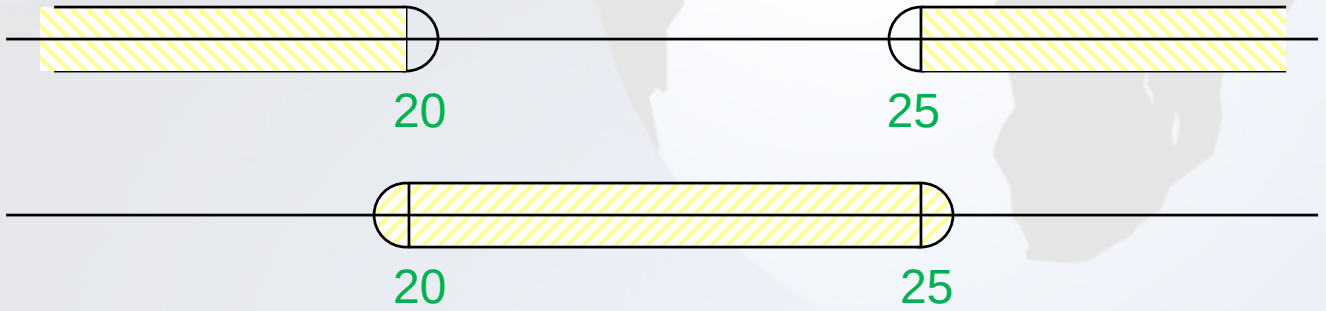
Logical NOT Operator

- Notice that the previous two conditions are the opposite of each other.

(temperature < 20) or (temperature > 25)

is equivalent to

not((temperature >= 20) and (temperature <= 25))



Truth Table of Logical Operators

cond1	cond2	cond1 and cond2	cond1 or cond2	not cond1
False	False	False	False	True
False	False	False	True	True
True	True	False	True	False
True	True	True	True	False

Precedence of Operators

Operators	Type	Precedence
( )	parentheses	highest
**	exponentiation	
+ -	Unary	
* / // %	multiplicative	
+ -	additive	
< <= > >= == != in, not in, is, is not	Relational, membership, identity	
not	Logical not	
and	Logical and	
or	logical or	lowest

Activity 1

- **Write compound conditions for the following with suitable variable names**

temperature is less than or equal to 75 or humidity is less than 70%	
taxRate is over 25% and income is less than $20000	
Students either getting scholarship or GPA above 3.5	
First year students who are scholarship holders and has GPA of 4	
GPA 3.5 or above but not getting any scholarship	

Activity 2 – CheckDivisibility.py

- Write a program that prompts user to enter an integer and outputs whether the number is divisible by both 5 and 6.

```
Enter an integer number: 30
30 is divisible by 5 and 6
>>> ================================
>>>
Enter an integer number: 50
50 is not divisible by 5 and 6
```

Activity 3 – CalAreaTriangle.py

- Given the length of all three sides of a triangle, a, b, c, the area of the triangle can be computed by using Heron's formula:

  area = $\sqrt{s(s-a)(s-b)(s-c)}$ ***where s*** = $\frac{a+b+c}{2}$

- Write a program to input the values of three sides. Calculate and display the area if the input values can form a triangle. Display an error message if the values are not able to form a triangle.
- Note
  - ✓ The values of the three sides can form a triangle only if sum of any two sides is larger than the third side.
  - ✓ (Hint: you need to use sqrt() function from math module)

```
Enter length of Side A: 20
Enter length of Side B: 5
Enter length of Side C: 20
Input lengths can form a triangle of area 49.61 square units
>>> ================================ RESTART ================================
>>>
Enter length of Side A: 20
Enter length of Side B: 5
Enter length of Side C: 12
Input lengths cannot form a triangle.
```

Activity 4 – DetLeapYear.py

- A year is said to be a leap year if it is divisible by 4 but not divisible by 100, except those that is divisible by 400.
- Write a program to determine if an input year is a leap year or not.

```
Please enter the year : 2018
2018 is not a leap year.
>>> ============================
>>>
Please enter the year : 2020
2020 is a leap year.
```

Reading Reference

- **How to Think Like a Computer Scientist: Learning with Python 3**
  - ✓ Chapter 5
  - ✓ http://www.openbookproject.net/thinkcs/python/english3e/conditionals.html
- **PolyMall – Problem Solving and Programming**
  - ✓ https://polymall.polytechnic.edu.sg/

Summary

- Compound conditions