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NGEE ANN
SCHOOL OF INFOCOMM TECHNOLOGY

Selection Structure III

if…elif…else statement

Programming I (PRG1)

Diploma in Information Technology

Diploma in Financial Informatics

Diploma in Information Security & Forensics

Year 1 (2018/19), Semester 1

Objectives

At the end of this lecture, you will understand

- if..elif…else (Multiway Selection Statement)

Recall

- Lecture 1

  You had learnt to calculate the BMI for a person.

  What's the purpose of this BMI?

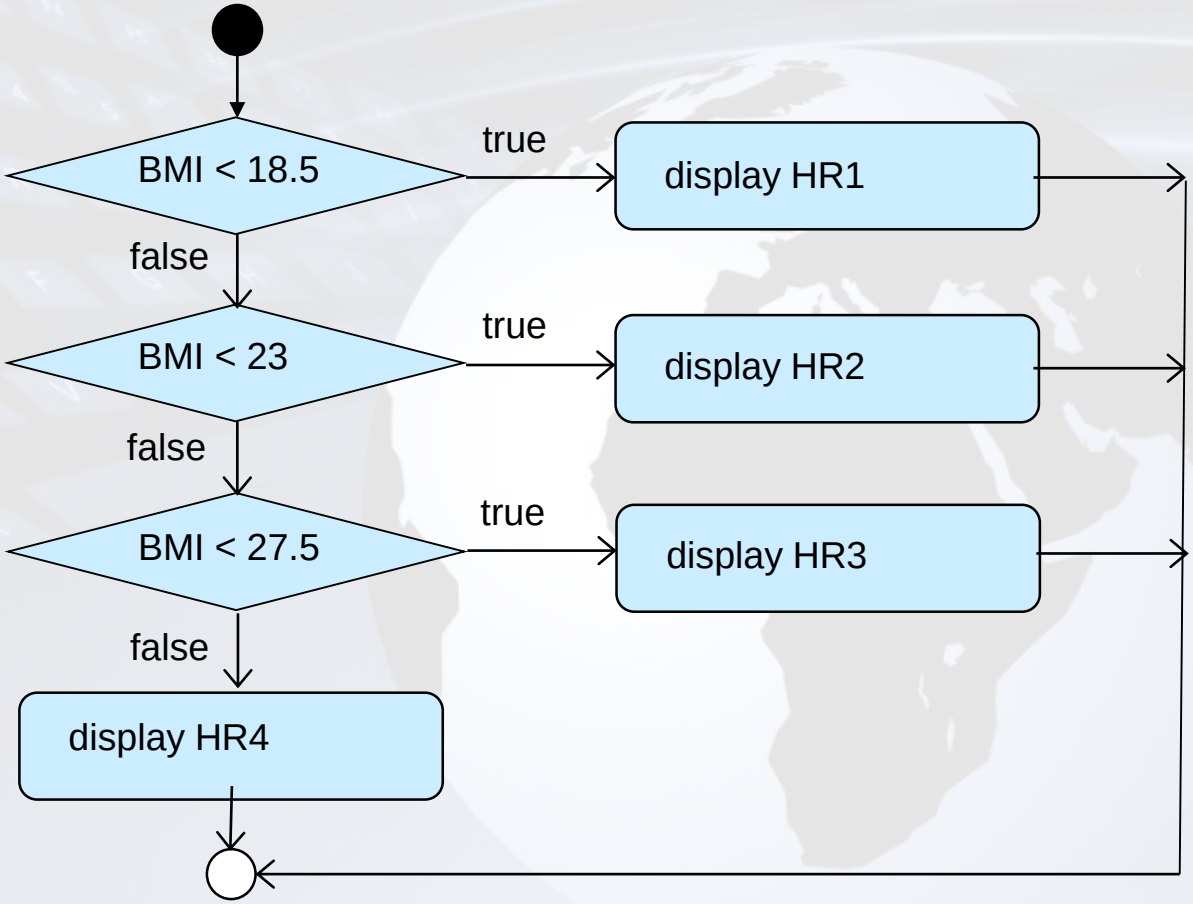
  How can you use it?

`if...elif...else` Multiway Selection

HR	Health Risk	BMI (kg/m^2)
HR1	Risk of developing problems such as nutritional deficiency and osteoporosis	under 18.5
HR2	Low Risk (healthy range)	18.5 to 23
HR3	Moderate risk of developing heart disease, high blood pressure, stroke, diabetes	23 to 27.5
HR4	High risk of developing heart disease, high blood pressure, stroke, diabetes	over 27.5

`if…elif…else` Multiway Selection

Flowchart:



`if…elif…else` Multiway Selection

Pseudocode:

```
IF BMI < 18.5 THEN
    display “Risk of developing osteoporosis"
ELSE IF BMI < 23 THEN
    display “Healthy"
ELSE IF BMI < 27.5 THEN
    display “Low risk of developing heart disease, stroke, etc."
ELSE
    display “High risk of developing heart disease, stroke, etc."
ENDIF
```

`if…elif…else` Multiway Selection

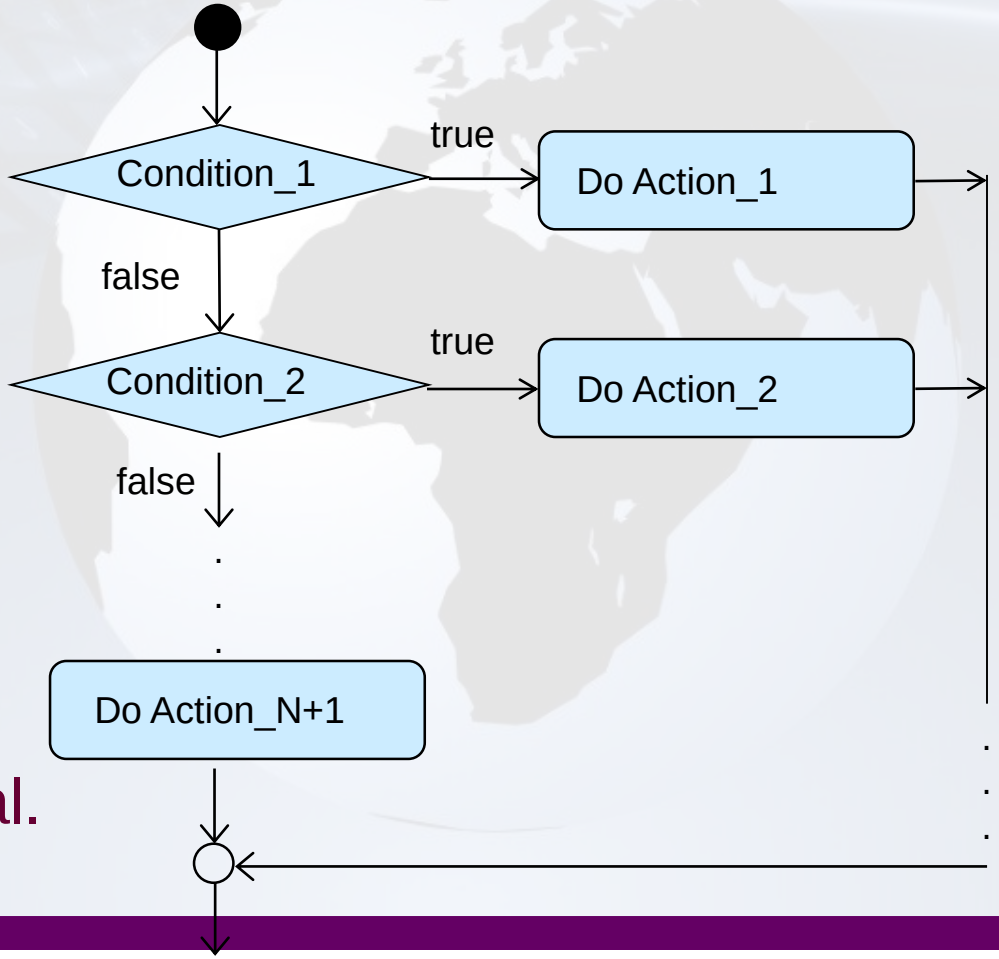
The algorithm can be translated into Python code as follows:

```
if BMI < 18.5:
    print("Risk of developing osteoporosis")
elif BMI < 23:
    print("Healthy")
elif BMI < 27.5:
    print ("Low risk of developing heart disease, stroke, etc.")
else:
    print("High risk of developing heart disease, stroke, etc.")
```

`if… elif…else` Multiway Selection

- Selects from various course of actions depending on the decision made
- General format:

```
if condition_1:
   true_statement_1
elif condition_2:
   true_statement_2
elif…
   ...
else:
   false_statement
```



- else statement is optional.

Multiway Selection

How about specifying both the upper and lower limit of the range of values? Is it necessary?

```
if BMI < 18.5:
    print("Risk of developing osteoporosis")
elif 18.5 <= BMI < 23:
    print("Healthy")
elif 23 <= BMI < 27.5:
    print ("Low risk of developing heart disease, stroke, etc.")
elif BMI >= 27.5:
    print("High risk of developing heart disease, stroke, etc.")
```

Checking of unnecessary conditions

=>waste of resources

=>inefficient!

Multiway Selection

How about using **multiple if** statements?

```
if BMI < 18.5:
    print("Risk of developing osteoporosis")
if 18.5 <= BMI < 23:
    print("Healthy")
if 23 <= BMI < 27.5:
    print ("Low risk of developing heart disease, stroke, etc.")
if BMI >= 27.5:
    print("High risk of developing heart disease, stroke, etc.")
```

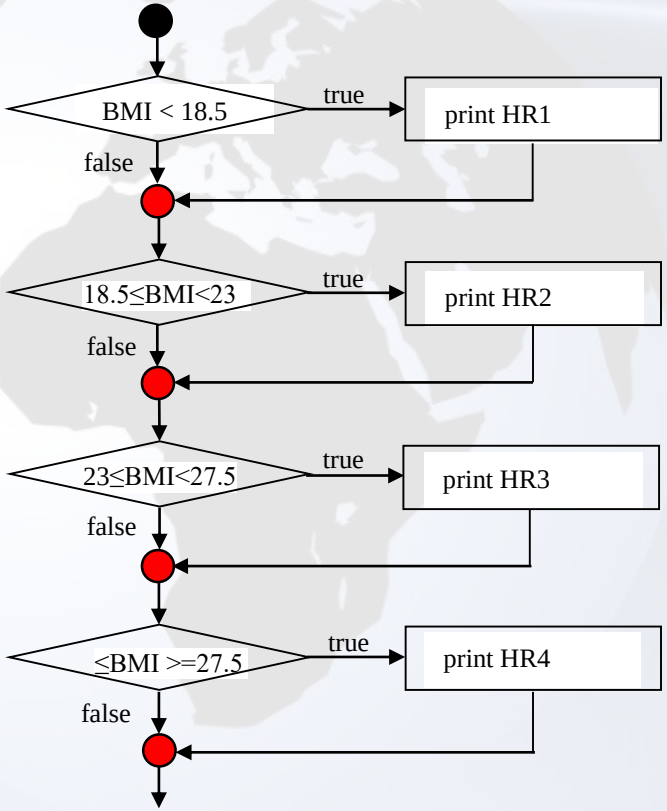
Multiway Selection

How about using **multiple if** statements?

Checking of more conditions again

=>waste of resources

=>inefficient!

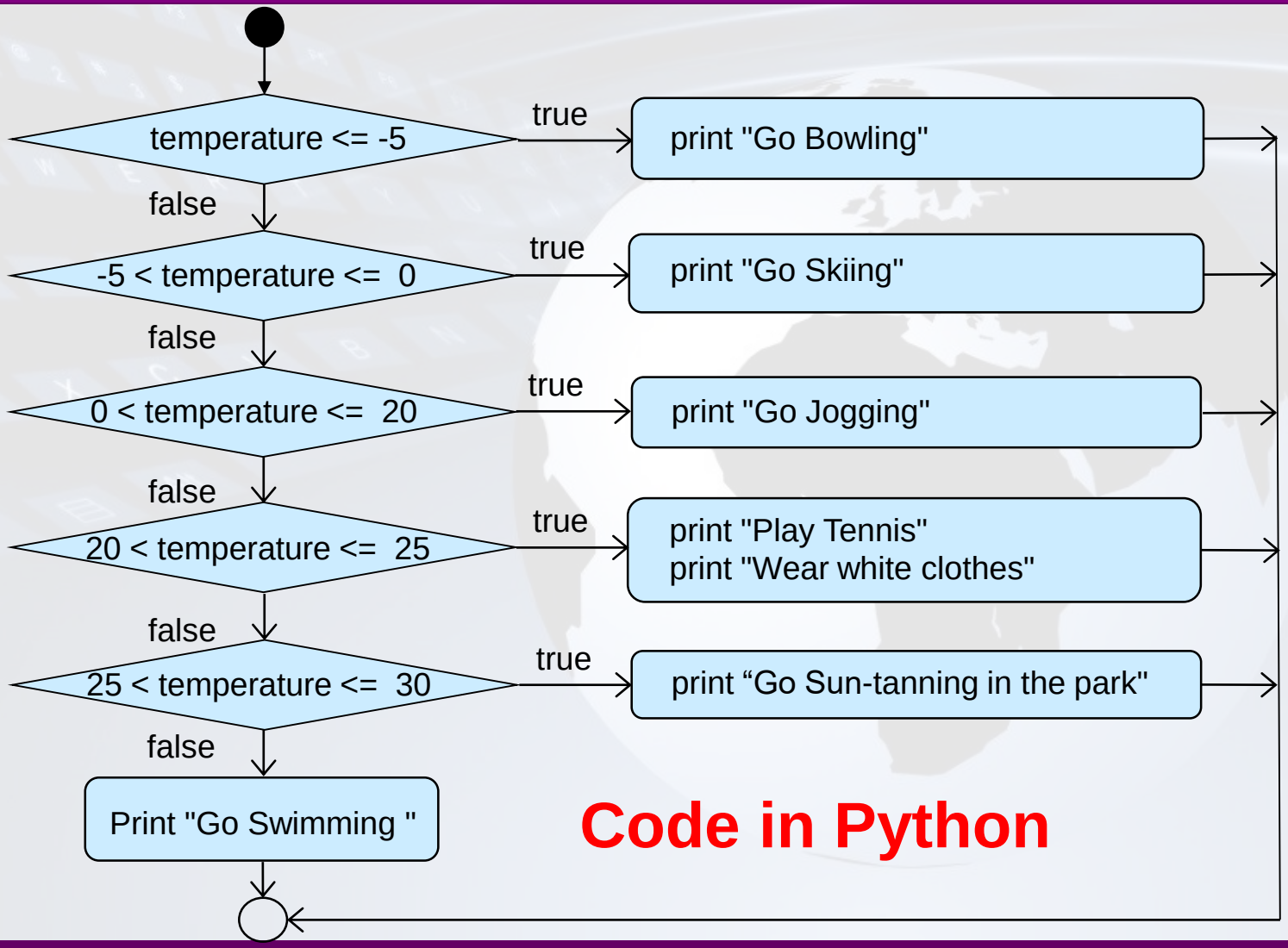


Activity 1

- If you are living in UK or Canada, you made plans to do various activities based on the outdoor temperature as follows:

Temperature	Activity
<= -5	Go Bowling
-5< and <= 0	Go Skiing
0< and <= 20	Go Jogging
20 <and <= 25	Play Tennis; wear white clothes
25 < and <= 30	Go Sun-tanning in the park
> 30	Go Swimming

Activity 1



Code in Python

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

The if…elif…else (Multiway-Selection Statement) chooses from various course of actions depending on which of the conditions evaluates to true.