

### Table of Contents

|   |       |
|---|-------|
| Decision Making with if-elif-else.....                | 2     |
| 1.Income Limits for Maintenance Grant.....            | 2     |
| 2.Degree Awards.....                                  | 3     |
| 3.Match Results.....                                  | 4     |
| 4.Percentage Free Space.....                          | 5     |
| 5.Power Ratio Conversion.....                         | 6     |
| 6.VAT.....  | 7     |
| <br>Decision Making with nested-ifs / and or not..... | <br>8 |
| 7.TV Show.....  | 8     |
| 8.Income Limits for Maintenance Grant (Again).....    | 9     |
| .....   | 10    |
| 9.Validate Email Address.....                         | 10    |

## Python Exercises 2a: Decision Making with `if-elif-else`

### Decision Making with `if-elif-else`

#### 1. Income Limits for Maintenance Grant

The family income limits for eligibility for a full maintenance grant in 2019-2020 are as follows:

| Number of dependent children | Full maintenance |
|------------------------------|------------------|
| Less than 4                  | €39,875          |
| 4 to 7                       | €43,810          |
| 8 or more                    | €47,575          |

Write a program which inputs the number of dependents and then determines and displays the corresponding income limit.

#### *Sample Outputs*

This program displays the income limits for a full maintenance grant

```
Number of dependents: 3
The income limit is: 39875
```

This program displays the income limits for a full maintenance grant

```
Number of dependents: 5
The income limit is: 43810
```

This program displays the income limits for a full maintenance grant

```
Number of dependents: 9
The income limit is: 47575
```

## Python Exercises 2a: Decision Making with `if-elif-else`

### 2. Degree Awards

In AIT, degrees are graded according to the average course mark as follows:

| Mark     | Grade                                  |
|----------|--|
| 70-100   | 1 <sup>st</sup> Class Honours          |
| 60 - <70 | 2 <sup>nd</sup> Class Honours, Grade 1 |
| 50 - <60 | 2 <sup>nd</sup> Class Honours, Grade 2 |
| 40 - <50 | Pass                                   |
| 0- <40   | No award                               |

Write a program which inputs a mark and determines and displays the corresponding grade. If an invalid mark is entered, a suitable error message should be displayed.

#### *Sample Outputs*

This program displays the grade awarded based on average mark

```
Enter average mark: 67
2nd Class Honours, Grade 1
```

This program displays the grade awarded based on average mark

```
Enter average mark: 35
No award
```

## Python Exercises 2a: Decision Making with `if-elif-else`



### 3.Match Results

Write a program which inputs the final score of a match:

home team name and score

away team name and score

and determines and displays the match result (the name of the winning team, or “draw”).

Sample Values:

| Home Team | Home Score | Away Team  | Away Score | Result          |
|-----------|------------|------------|------------|-----------------|
| Latvia    | 1          | Sweden     | 4          | Winner: Sweden  |
| Wales     | 2          | N Ireland  | 2          | Draw            |
| Ireland   | 2          | Montenegro | 0          | Winner: Ireland |

#### *Sample Outputs*

Home team name? Latvia

Home team name? Wales

Home team name? Ireland

Home team score? 1

Home team score? 2

Home team score? 2

Away team name? Sweden

Away team name? N Ireland

Away team name? Montenegro

Away team score? 4

Away team score? 2

Away team score? 0

Winner is Sweden

Draw

Winner is Ireland

## Python Exercises 2a: Decision Making with `if-elif-else`



### 4. Percentage Free Space

An important System Administration task is to monitor the availability of disk space on a computer system:

- If there is no free space, the system might crash;
- If the percentage of free disk space is less than 5% then system performance degrades.
- If at least 5% disk space is available, then system performance is unaffected.

Write a Python program which will input the total disk space and the amount used. The program should then

- check if the amount used exceeds the total disk space; if it does, then a message should be displayed indicating that the input data is invalid;
- otherwise calculate and display the percentage of free space. It should then determine and display a message based on the amount of free space.

#### *Sample Outputs*

```
Enter total space: 500
```

```
Enter amount used: 500
The percentage free space is 0.0%
Warning: system full
```

```
Enter total space: 500

Enter amount used: 489
The percentage free space is 2.2%
Warning, low disk space
```

```
Enter total space: 500

Enter amount used: 350
The percentage free space is 30.0%
System has sufficient disk space
```

## Python Exercises 2a: Decision Making with `if-elif-else`



### 5. Power Ratio Conversion

**dBm** is an abbreviation for the power ratio in decibels (dB) of the measured power referenced to one milliwatt (mW). It is used in radio, microwave and fiber optic networks as a convenient measure of absolute power.

To convert from power  $P$  (in milliwatts) to dBm:  $dBm = 10 \log_{10} P$

To convert from dBm to power (in milliwatts):  $P = 10^{\frac{dBm}{10}}$

Write a program which will convert power to dBm, or dBm to power, depending on the user's choice. The program should input the required value and display the converted equivalent. If the user inputs an invalid choice, then a suitable error should be displayed.

#### Sample Outputs

Program for Power Ratio Conversions

1. Power to dBm
2. dBm to Power

Enter your choice: 1

Enter Power in milliwatts: 100  
Power ratio is 20.0 decibels

Program for Power Ratio Conversions

1. Power to dBm
2. dBm to Power

Enter your choice: 2

Enter Power Ratio in decibels: 5  
Power is 3.2 milliwatts

## Python Exercises 2a: Decision Making with `if-elif-else`



### 6.VAT

The VAT (Value Added Tax) Rates for Ireland are:

| Category  | Rate  |
|-----------|-------|
| Standard  | 23%   |
| Reduced   | 13.5% |
| Lower     | 9%    |
| Livestock | 4.8%  |
| Exempt    | 0%    |

Write a program which inputs the price of an item and the VAT category, and then calculates and displays the VAT due and the total price.

#### *Sample Outputs*

This program calculates VAT

Enter price of the item: 1200

Enter VAT category: standard

VAT due is 276.00

Total price including VAT is 1476.00

This program calculates VAT

Enter price of the item: 55

Enter VAT category: lower

VAT due is 4.95

Total price including VAT is 59.95

## Python Exercises 2a: Decision Making with `if-elif-else`



### Decision Making with nested-ifs / `and` or `not`

#### 7. TV Show

(a) A new reality TV show is looking for single people aged between 18 and 35 to take part.

Write a program which inputs a person's age and marital status and displays a message indicating whether or not the person is suitable for the TV show.

#### Sample Outputs

Program to check suitability for TV show      Program to check suitability for TV show

Enter your age: 28

Enter your age: 28

Enter your marital status: single  
You are suitable for the TV show

Enter your marital status: married  
You are not suitable for the TV show

Program to check suitability for TV show

Enter your age: 39

Enter your marital status: single  
You are not suitable for the TV show

(b) Due to poor ratings, the producers want to include celebrities on the show, and the eligibility rules do not apply for them. However, they must be a genuine celebrity. The Q Score is a measurement of how famous someone is. The higher the Q Score, the more famous they are. [http://en.wikipedia.org/wiki/Q\\_Score](http://en.wikipedia.org/wiki/Q_Score) To be considered a “genuine celebrity”, they must have a Q score over 50.

Modify the program so that it inputs a person's age, marital status and Q score and displays a message indicating whether or not the person is suitable for the TV show. Non-celebrities have a zero Q score.

#### Sample Outputs

Program to check suitability for TV show      Program to check suitability for TV show

Enter your Q Score: 75  
You are suitable for the TV show

Enter your Q Score: 0

Enter your age: 28

Enter your marital status: single  
You are suitable for the TV show



## Python Exercises 2a: Decision Making with `if-elif-else`

### 8. Income Limits for Maintenance Grant (Again)

The family income limits for eligibility for a full maintenance grant in 2019-2020 were as follows:

| Number of dependent children | Full maintenance |
|------------------------------|------------------|
| Less than 4                  | €39,875          |
| 4 to 7                       | €43,810          |
| 8 or more                    | €47,575          |

Write a program which inputs the number of dependents income, and then displays a message indicating whether or not a person is eligible for a full maintenance grant.

#### *Sample Outputs*

```
This program checks eligibility for a full maintenance grant
```

```
Number of dependents: 3
```

```
Input income: 30000
```

```
You are eligible for a full maintenance grant
```

```
This program checks eligibility for a full maintenance grant
```

```
Number of dependents: 6
```

```
Input income: 75000
```

```
You are not eligible for a full maintenance grant
```

## Python Exercises 2a: Decision Making with `if-elif-else`



### 9. Validate Email Address

AIT's Wireless service, EduRoam, requires that users login using their email address. The email address must be a valid Student email address (in the form A00123456@student.ait.ie) or a valid Staff email address (in the form jbloggs@ait.ie), based on the following:

Student Email: starts with "A00" and ends with @student.ait.ie

Staff Email: ends with @ait.ie

Otherwise: not a valid AIT email address

Write a Python program which will input an email address, and determine and display a message indicating whether or not it appears to be a valid AIT Student or Staff email address.

#### *Sample Outputs*

```
This program validates email addresses for use with EduRoam
```

```
Enter the email address: A00123456@student.ait.ie
Valid AIT Student Email Address
```

```
This program validates email addresses for use with EduRoam
```

```
Enter the email address: jbloggs@ait.ie
Valid AIT Staff Email Address
```

```
This program validates email addresses for use with EduRoam
```

```
Enter the email address: jbloggs@student.ait.ie
Not a valid AIT email address
```

```
This program validates email addresses for use with EduRoam
```

```
Enter the email address: A00123456@gmail.com
Not a valid AIT email address
```