



Programming – Selection with if

GCSE Student Booster

Key Information

- 1) Remember this booster is here to **help you**. Please consider your behaviour in the chat.
- 2) If you are in a room with a teacher/group, please login to the meeting. This is so we can mark your attendance. This information goes into a **prize draw**.
- 3) Make sure the name on the meeting is the **SAME** as the name on your Isaac account. We can't mark you present if they don't match.



Learning Outcomes

To be able to use IF...Else statements in our programming
 To be able to use IF... Elif...Else statements in our programming
 To be able to use relational operators and tell the differences between



Programming – Selection



DO NOW

Predict what this code will do. Write your answers in the **chat now!**

How can it be improved?

```
print("Do you like cycling? Answer yes or no")
answer = input()
if answer == "yes":
    print("Great, you will get fit.")
else:
    print("You should try it!")
print("Goodbye")
```



Selection



Checking a **condition** and **selecting** between two **branches** of code.



Selection – simple example in Python



In this example, the condition **weather == "rain"** decides if **line 4** executes or not.

```
1 print("What's the weather like?")
2 weather = input()
3 if weather == "rain":
4     print("Take your umbrella")
5
6 print("Time to go out")
```



Condition

An **expression** which evaluates to either **True** or **False**.



Condition

A condition compares TWO pieces of data

data1 **operator** data2

A **relational** or **comparison** operator such as == or > tells us what type of comparison to make.

e.g. `weather == "rain"`



Operators Used in Conditions

- ==** Equal to/The same as
- !=** Not equal to/Different
- >** Greater than
- >=** Greater than or equal to
- <** Less than
- <=** Less than or equal to



Not Equal To
– different notation styles

\neq

\neq

\neq



Worked Example 1

Evaluate this condition: True or False?

$6 == 5$

False



Worked Example 2

Evaluate this condition: True or False?

$6 \neq 5$

True



Worked Example 3 – String

Evaluate this condition: True or False?

"pa55w0rd" == "pa55w0rd"

True



Worked Example 4 – String

"pa55w0rd" == "Pa55w0rd"

False



Task 1



Handout 1

3 minutes

Condition	Returns (True/False)
5==5	
5!=5	
6<4	
4>=4	
4>4	
"Giraffe" == "Giraffe"	
"Giraffe" == "giraffe"	
"Giraffe" != "Hippo"	



Task 1 – Solutions

Condition	Returns (True/False)
5==5	True
5!=5	False
6<4	False
4>=4	True
4>4	False
"Giraffe" == "Giraffe"	True
"Giraffe" == "giraffe"	False
"Giraffe" != "Hippo"	True



Boolean Operators

AND
OR



Boolean Operators

AND

`user_name == "admin" AND password == "P4$$w0rd"`

`year_group >= 7 AND year_group <= 11`



Boolean Operators

OR

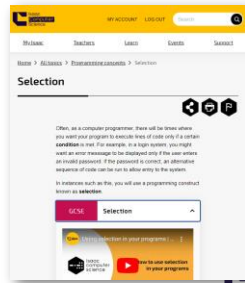
month <= 1 OR month >= 12



Isaac Computer Science

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[IsaacComputerScience.org](https://isaaccomputer-science.org)
is your totally free online
textbook and revision aid.

It contains the entire **GCSE**
and **A-level** syllabus and
hundreds of high-quality
self-assessment questions.



Selection (if.....)

Use selection to run certain
instructions **only** when a
condition is **true**



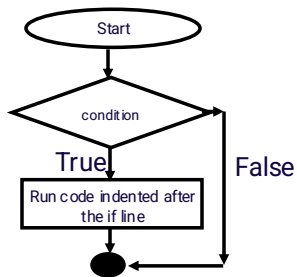
Give the line number where selection starts

Whiteboard/Chat Task

```
1 print("What's the weather like?")
2 weather = input()
3 if weather == "rain":
4     print("Take your umbrella")
5
6 print("Time to go out")
```



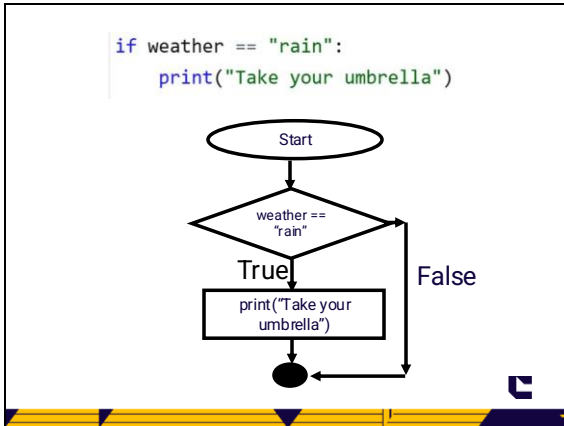
Selection With One Outcome - Flowchart



How to Code Selection

```
if condition:
    Instruction 1
    Instruction 2
```





Using Selection in a Program

```

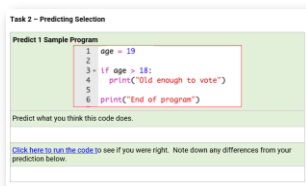
1 print("What's the weather like?")
2 weather = input()
3 if weather == "rain":
4     print("Take your umbrella")
5
6 print("Time to go out")

```

Task 2 Three Predict/Run Tasks

Handout 1
6 minutes

1. Read the code and think about what the output will be when it runs.
2. Write a prediction about what the output will be
3. Follow the link to the code, run it and compare with your prediction.
4. Write down any differences from your prediction.



Task 2 Solutions – 2.1

```
1 age = 19
2
3 if age > 18:
4     print("Old enough to vote")
5
6 print("End of program")
```

19 is greater than 18, so the code will display

Old enough to vote
End of program



Task 2 Solutions – 2.2 and 2.3

```
1 age = 17
2
3 if age > 18:
4     print("Old enough to vote")
5
6 print("End of program")
```

17 is clearly not greater than 18, so the code will just display "End of program"

```
1 age = 18
2
3 if age > 18:
4     print("Old enough to vote")
5
6 print("End of program")
```

18 is **still not** greater than 18, so the code will just display "End of program"

How should the code be changed, if 18 year-olds are allowed to vote?

age >= 18



Two Branches



Selection with two branches

Which line numbers will execute for the input "Paris"?

```
1 print("What's the capital of France?")
2 answer == input()
3
4 if answer == "Paris":
5     print("Correct")
6 if answer != "Paris":
7     print("Wrong")
```

Selection with two branches

Which line numbers will execute for the input "Paris"?

```
1 print("What's the capital of France?")
2 answer == input()
3
4 if answer == "Paris":
5     print("Correct")
6 if answer != "Paris":
7     print("Wrong")
```

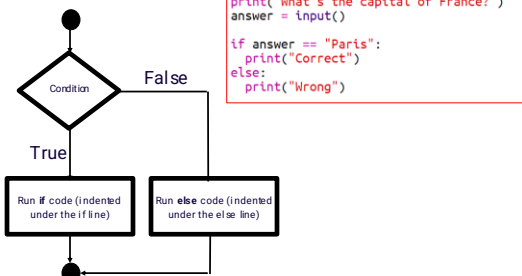
if... else...

Use **else** to run instructions **only** when the condition is **false**.

if condition:
True branch

else: No condition needed on else.
False branch

Selection with two branches - Flowchart



```

print("What's the capital of France?")
answer = input()

if answer == "Paris":
    print("Correct")
else:
    print("Wrong")
  
```

Task 3 – Predict selection with two branches

Handout 1
6 minutes

1. Read the code and think about what the output will be when it runs.
2. Write a prediction about what the output will be
3. Follow the link to the code, run it and compare with your prediction.
4. Write down any differences from your prediction.

Task 3 - Predict Selection With Two Branches

Predict 3.1 Sample Program

```

1 age = 14
2
3 if age >= 17:
4     print("You are old enough to learn to drive.")
5 else:
6     print("You are not old enough to learn to drive.")
7
8 print("End of program")
  
```

Predict what you think this code does.

[Click here to run the code to see if you were right. Note down any differences from your prediction below.](#)

Task 3 – Solution 3.1

```

1 age = 14
2
3 if age >= 17:
4     print("You are old enough to learn to drive.")
5 else:
6     print("You are not old enough to learn to drive.")
7
8 print("End of program")
  
```

You are not old enough to
learn to drive.
End of program

Task 3 – Solution 3.2

```

1 monthNumber = 9
2
3 if monthNumber > 0 and monthNumber < 13:
4     print("This is a valid month")
5 else:
6     print("This is not a valid month")
7
8 print("End of program")

```

This is a valid month
End of program



Task 4 – Modify



Handout 1

5 minutes

Follow the link and modify the code using the instructions provided.

Task 4 – Modify Selection With Two Branches

This program determines whether a month number is valid.

```

1 monthNumber = 9
2
3 if monthNumber > 0 and monthNumber < 13:
4     print("This is a valid month")
5 else:
6     print("This is not a valid month")
7
8 print("End of program")

```

[Click here to open the code online.](#)

Change the program so that it checks if a child is eligible for preschool as follows:

- The program should get the user to input their child's age in years.
- The child must be aged between 2 and 5 inclusive, i.e. 2, 3, 4 or 5 for preschool.
- Output an appropriate message for each situation (eligible/not eligible).

Paste the finished code below



Task 4 – Modify – Solution

```

1 print("Enter age")
2 age = int(input())
3
4
5 if age > 1 and age < 6:
6     print("Eligible")
7 else:
8     print("Not eligible")
9
10 print("End of program")

```



Three or more branches



Example code – two branches

```
1 num1 = 100
2 num2 = 50
3
4 if num1 > num2:
5     print(str(num1) + " is bigger.")
6 else:
7     print(str(num2) + " is bigger.")
```



elif: (if.. elif..else...)

Use **elif** to add more conditions to an **if** statement.

Useful when there are more than two possible situations to cater for.

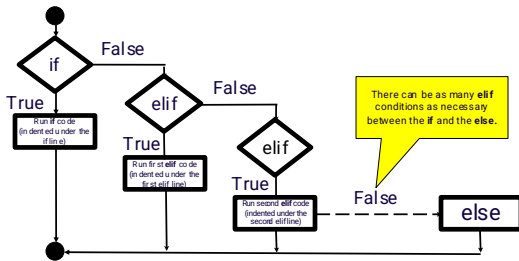


NB elif is short for **else if** and is written **elseif** in OCR ERL

Image source - Pixabay



Selection With Three Or More Outcomes - Flowchart



Selection - Three Or More Outcomes

```

1 num1 = 100
2 num2 = 50
3
4 if num1 > num2:
5     print(str(num1) + " is bigger.")
6 elif num2 > num1:
7     print(str(num2) + " is bigger.")
8 else:
9     print("Numbers are the same")
10

```

Task 5 - Modify

Handout 1
10 minutes

Follow the link and modify the code using the instructions provided.

Task 5 - Modify Selection With More Than Two Branches

This program is part of an adventure game.

```

1 print("You are in a spooky forest.")
2 print("Which direction shall you go? North (n), east (e), west (w) or south (s).")
3 direction = input()
4
5 if direction == "n":
6     print("You see a majestic castle on the horizon")
7 elif direction == "e":
8     print("You find yourself on a windswept beach")
9

```

[Click here to open the code online.](#)

Change the code so that:

- For an input of 'w', give the output 'Oh no! You are sinking in a bubbling marsh!'
- For an input of 's', give the output 'Phew! You are scaling a craggy peak.'
- For all other inputs, give the output 'That's not a direction I recognise.'

Paste the finished code below

Task 5 Modify – Solution

```

1 print("You are in a spooky forest")
2 print("Which direction shall you go? North (n), east (e), west (w) or south (s).")
3 direction = input()
4
5- if direction == "n":
6     print("You see a majestic castle on the horizon")
7- elif direction == "e":
8     print("You find yourself on a windswept beach")
9- elif direction == "w":
10    print("Oh no! You are sinking in a bubbling marsh!")
11- elif direction == "s":
12    print("Phew! You are scaling a craggy peak.")
13- else:
14    print("That's not a direction I recognise")

```



Task 6 – Make "Which Room?" 10 minutes



Handout 1

Task 6 – Make Selection With More Than Two Branches

Which Room Program

Write a program that asks the user to input:

- their name
- which subject they are studying.

The program should output a message telling the student by name which room to go to for that class. Include these subjects:

Computing , 401
Music , 404
History , 302
English , 345

Any other subject input should get an output of I don't know that subject.

Example - an input of 'Ben' and 'Computing' would output:
"Hi Ben, go to room 401 for Computing"

Explorer task:

Use iteration and data structures to make your program more efficient.

- Create two lists. One should store the subjects and one should store the corresponding room numbers.
- Iterate over the list to find the matching subject and output the appropriate message to the user.

[Click here for the starter code](#)



Task 6 Make – Solution

```

1 print("What's your name?")
2 name = input()
3 print("What subject are you studying")
4 subject = input()
5
6- if subject == "Computing":
7     print("Hi " + name + ", go to room 401 for Computing")
8- elif subject == "Music":
9     print("Hi " + name + ", go to room 404 for Music")
10- elif subject == "History":
11    print("Hi " + name + ", go to room 302 for History")
12- elif subject == "English":
13    print("Hi " + name + ", go to room 354 for English")
14- else:
15    print("I don't know that subject.")

```



Match Case in Python

Match is used to **compare a value** against a **series of patterns**.

This can **improve code readability** by reducing the need for nested if statements.

```
1 i = 2
2
3 match i:
4     case 1:
5         print("i is equal to 1")
6     case 2:
7         print("i is equal to 2")
8     case _:
9         print("i is equal to something else")
```

Result

Powered by  trinket
i is equal to 2



Switch Case (OCR)

In the exam, you can use the following syntax to implement a match case:

```
i = 2
switch i:
    case 1:
        print ("i is equal to 1")
    case 2:
        print("i is equal to 2")
    default:
        print("i is equal to something else")
endswitch
```

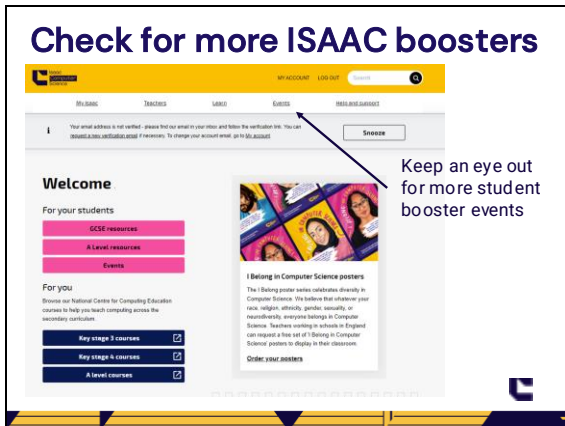


Exam question tips:

1. Read the question carefully
2. What inputs does it need?
3. What outputs does it need?
4. Does it need any Maths? If so what Maths does it need?
5. Does it require an If, For or While?
6. Does the question require you to use a function or procedure?



Check for more ISAAC boosters



Keep an eye out for more student booster events

Learning Outcomes

To be able to use IF...Else statements in our programming

To be able to use IF... Elif...Else statements in our programming

To be able to use relational operators and tell the differences between

Isaac Gameboard

Complete the gameboard at bit.ly/iginputs

You will need to sign in to **Isaac Computer Science** or register for a free account if not done already.

