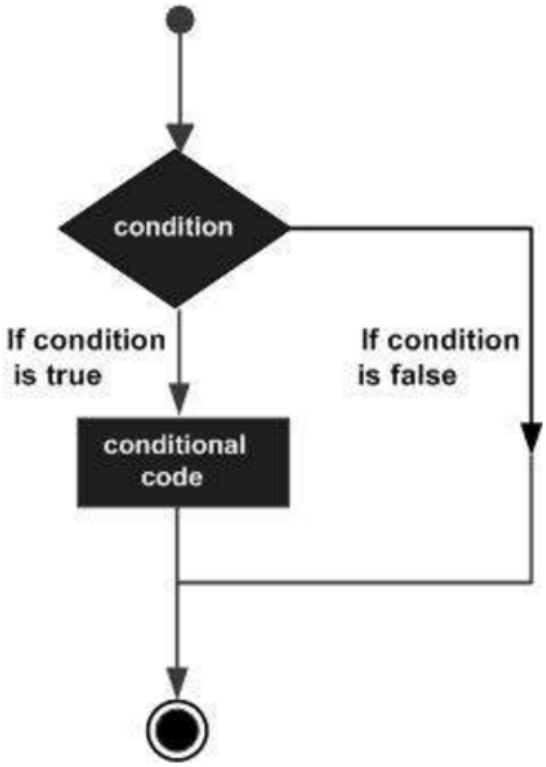
Programs are often represented by flow diagram since a flow diagram is an easy way to visualize the structure of a program, see page 179 of the textbook. Decision making is represented as follows:



The condition code can consist of many lines.

The main decision making is python is the “if” statement. See the follow example:

Computer Experiment 1

Run the program and experiment with different values of a and b and note the output. The conditional code is a few spaces away from the edge.

File Edit Format Run Options Window Help

```
a=3
b=4

if a<b:
    print "boo !!"
    print "end of conditional code"


print "end of program"
```

The comparison operators that you can use are:

Operator	Description	Example
==	If the values of two operands are equal, then the condition becomes true.	(a == b) is not true.
!=	If values of two operands are not equal, then condition becomes true.	
<>	If values of two operands are not equal, then condition becomes true.	(a <> b) is true. This is similar to != operator.
>	If the value of left operand is greater than the value of right operand, then condition becomes true.	(a > b) is not true.
<	If the value of left operand is less than the value of right operand, then condition becomes true.	(a < b) is true.
>=	If the value of left operand is greater than or equal to the value of right operand, then condition becomes true.	(a >= b) is not true.
<=	If the value of left operand is less than or equal to the value of right operand, then condition becomes true.	(a <= b) is true.

The strange things for equals you need two == signs.
In the above program use different operators and run the program a few times to understand how these are used in an if statement.

The if statement can be used to compare strings, and else statement gives you more options, consider this program:

File Edit Format Run Options Window Help

```
a=raw_input("enter a word")
b="z"

c=a[0]

if c==b :
    print "the word begins with ",b
else:
    print "the word does not begin with ",b
```

Computer Experiment 2

Run the above program a few times. Enter words starting with z and some that do not start with z. Is the program case sensitive? I.e. does capitalization make any difference?

Exercise 1

Write a program where the person enters their first name. The program determines the length of the name, and then determines if the name ends with the letter “a”. If the name ends with an a, then the person wins a 1000 dollar prize. The program informs the person that they have or have not won the prize. You will need to use the len(string) method, look it up here:
https://www.tutorialspoint.com/python/python_strings.htm

Exercise 2

The rules for winning the prize have got stricter. The first name must now have more than 5 characters (as well as end in the letter a). Modify the program in Exercise 1. You will have to use nested if statements:
https://www.tutorialspoint.com/python/nested_if_statements_in_python.htm
Can you draw a flow diagram for your program?

Checking between values:

```
n=input("enter your age")
if 18 <= n <= 25:
    print"you get a student discount on your railway pass"
else:
    print"pay the normal fare"
```

Run this program a few times to become familiar with the format.

Exercise 3

Write a program where a person enter the year of their birth. Person below the age of 18 have to buy a child fare, and persons 65 and above get a pensioners discount. Your program will calculate their age and advise them on the right ticket according to their age.

Computer Experiment 3

If with elif to check a value many times:

Run the following program a few times to understand how elif works:

```
var=input("enter your number")
if var == 200:
   print "1 - Got a true expression value"
   print var
elif var == 150:
   print "2 - Got a true expression value"
   print var
elif var == 100:
   print "3 - Got a true expression value"
   print var
else:
   print "4 - Got a false expression value"
   print var

print "Good bye!"
```

Note that a series of elifs must be after an if statement.

Computer experiment 4

Run the following program a few times

```
File Edit Format Run Options Window Help
# checking for many values

x=input("enter a number between 1 and 9 ")

if x>0:
    print "within range"

else:

    print "out of range"
```

An if elif series is inserted inside the first condition:

```
# checking for many values

x=input("enter a score between 1 and 9 ")

if x>0:
    print "within range",x
if x == 1:
        print "lowest score"
elif x == 2:
        print"second lowest score"
elif x ==3 :
        print "third lowest score"


else:

    print "out of range"
```

Run the program a few times so that you understand how it works. Modify the above program so that the program prints a comment for every score between 1-9.

Exercise 4

A high level maths students takes a test. Write a program where the student enters their percentage mark. The program outputs their grade according to:

70% or more grade 7
Between 60 and 69 grade 6
Between 50 and 59 grade 5
Between 40 and 49 grade 4
Between 30 and 39 grade 3
Between 20 and 29 grade 2
Less than 20 a grade 1