

Benjamin Gaylard

by Benjamin Gaylard

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Variable types

Integer

An integer which are also called int or ints is a whole. For example, 42. This is an whole number as it has not got any decimals or is not an text value. In python an integer can be any length however it is limited up to the memory of the computer space.

```
myNumber = 3  
print(myNumber)
```

Strings

A string is a text value such as hello my name is Benjamin. Python will recognise this as being a string as the user would have entered single (') or double brackets (") around the text. When writing your code, the user could put "str" this is to make sure that the code will come out correctly.

```
myName = Benjamin  
print(myName)
```

Float

float has another name floating point real value however when we write our code we use the word float and not floating-point real value. These represent decimals numbers such as 3.142.

```
pizzaPrice = 1.65  
print(pizzaPrice)
```

If, Else and Elif

In python there, several simply logic statements which are if, else and elif.

IF

An IF statement in python to other programming languages. An IF statement contains a logical expression which uses data and then compared and a decided which is the best one based on the result of the comparison.

If this statement expression evaluates to TRUE, then the block of statement(s) inside the if statement is executed. If statement expression evaluates to FALSE, then the first set of code after the end of the if statement(s) is executed.

```
if expression:  
    statement(s)
```

Else

This statement is a combination of two different statements. This statement contains blocks of codes that executes if a condition expression in the if statement is resolved. This statement is optional to the use.

```
print("Please enter your age: ")
userAge = int(input())
```

```
if userAge < 18 or userAge > 30:
    print("Sorry, you're outside the age group")
else:
    print("You qualify!")
```

Elif

This statement allows you to check multiple expressions for example, TRUE if the code is true then it picks the best one that meets the best conditions if it is TRUE.

Like the else statement, the elif statement is optional. However, unlike else, for which there can be more than one statement, there can be an arbitrary number of elif statements following an if.

```
print("Please enter your first topping: ")
topping1 = input()
```

```
print("Please enter your second topping: ")
topping2 = input()
```

```
if topping1 == "ham" and topping2 == "pineapple":
    print("Hawaiian!")
elif topping1 == "pineapple" and topping2 == "ham":
    print("Hawaiian!")
else:
    print("Not Hawaiian")
```

While and For loops

In general, statements are executed sequentially: The first statement in a function is executed first, followed by the second, and so on. There may be a situation when you need to execute a block of code several number of times.

Programming languages provide various control structures that allow for more complicated execution paths.

While loop

A while loop statement in Python programming language repeatedly executes a target statement if a given condition is true.

While loops can be a single statement or a multiple statement. The condition may be any expression, and true can be a non-zero value in some cases. The loop iterates while the condition is true.

When the condition becomes false, the program then passes it the line immediately following the loop.

```
print("Enter your age, it must be 18 or more: ")
userAge = int(input())
```

```
while userAge < 18:
    print("Sorry that was invalid")
    userAge = int(input("Try again: "))
```

```
print("Thank you!")
```

For Loops

This statement is combined with other items from any sequence, such as a list or a string.

```
print("What table would you like to see?")
userTable = int(input())
```

```
for myCounter in range(1, 13):
    total = myCounter * userTable
    print(myCounter, "times", userTable, "is", total)
```

Part B

Exercise One

a) Logical stages

1. Prompt user to enter the car make
2. Prompt user to enter the car model
3. Prompt user to enter the total mileage of the car
4. Prompt user to enter the number of doors
5. Print result on the screen

```
b) print("Please enter the make of your car:" )
userMake = input() # user enters the cars make
print("Please enter the model of the car:" )
userModel = input() #ruser enters the cars model
print("Please enter the total mileage of the car:" )
userMileage = int(input())
while (userMileage <=0):
    print("Try again, the mileage must be above 0") # If the number is below 0 then try again
    and make sure the number is positive
    userMileage = int(input())
print("Please enter how many doors your car has:" )
userDoors = int(input())
while (userDoors <=3):
    print("Try again, the doors must be above 0") # If the number is below 3 then try again
    userDoors = int(input())
print("The make of your car is a", userMake, "the model of your car is a", userModel, "the
mileage of your car is", userMileage, "your car has", userDoors, "doors")
```

Normal values, within range

```
C:\Users\Benjamin\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Benjamin/PycharmProjects/pythonProject1/new4.py
Please enter the make of your car:
merc
Please enter the model of the car:
a1class
Please enter the total mileage of the car:
15000
Please enter how many doors your car has:
4
The make of your car is a merc the model of your car is a aclass the mileage of your car is 15000 your car has 4 doors

Process finished with exit code 0
```

Result: Program performed as expected, correct answer calculated

Boundary

Test number of doors for valid input and Test for out of range numbers

```
C:\Users\Benjamin\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Benjamin/PycharmProjects/pythonProject1/new4.py
Please enter the make of your car:
merc
Please enter the model of the car:
A-Class
Please enter the total mileage of the car:
-4
Try again, the mileage must be above 0
-1
Try again, the mileage must be above 0
4
Try again, the mileage must be above 0
100
Please enter how many doors your car has:
```

Result: Program performed as expected was not allowed to enter out of range numbers. This means that the program was formed correctly.

Boundary

Test number of doors for valid input and Test for out of range numbers

```
100
Please enter how many doors your car has:
0
Try again, the doors must be above 3
-5
Try again, the doors must be above 3
3
The make of your car is a Merc the model of your car is a A-Class the mileage of your car is 100 your car has 3 doors

Process finished with exit code 0
```

Result: User was not allowed to enter out of range numbers Program performed correctly

Exercise 2

a) Logical stages

Prompt user to enter the base for the triangle
Check number entered for the base is above 0 (if not back to previous stage)
Prompt user to enter the height for the triangle
Check number entered for the height is above 0 (if not back to previous stage)
Prompt user to enter the radius for the circle
Check number entered for the radius is above 0 (if not back to previous stage)
Calculate the area for the triangle using the formula $b \cdot h / 2$
Calculate the area for the circle using the formula $\pi \cdot r^2$
Calculate area for the shaded area of the circle using the formula area of triangle - area of circle
Print result on the screen

b)

```
print("What would you like the base of your triangle to be:")
Base = float(input()) # User enters the measurements for the base
while(Base<=0):
    print("Try again, must be above 0")
    Base = float(input()) # Check to see if the base is a positive number and try again
print("What would you like the height of your triangle to be:")
Height = float(input()) # User enters the measurements for the Height
while(Height<=0):
    print("Try again, must be above 0")
    Height = float(input()) # Check to see if the height is a positive number and try again
print("What would you like the radius of your circle to be:")
Radius = float(input()) # User enters the measurements for the radius
while(Radius<=0):
    print("Try again, must be above 0 or must be larger than the base and height of the triangle")
    Radius = float(input()) # User enters the measurements for the radius
areaofthetriangle = Base * Height / 2 # Calculate the area for the triangle
print("The area of your triangle is", areaofthetriangle) # Print out final area for the triangle
pi = 3.142
areaofthecircle = Radius * Radius * pi
print("The area of the circle is:", round(areaofthecircle,2)) # Print out final area for the circle
areaoftheshadedpart = areaofthecircle - areaofthetriangle
print("The area of the shaded part of the circle is:", areaoftheshadedpart) # Print final part of the shaded part of the circle
```

Normal values, within range

```
C:\Users\Benjamin\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Benjamin/PycharmProjects/pythonProject1/new3.py
What would you like the base of your triangle to be:
3
What would you like the height of your triangle to be:
3
What would you like the radius of your circle to be:
7
The area of your triangle is 3.0
The area of the circle is: 153.96
The area of the shaded part of the circle is: 150.958

Process finished with exit code 0
|
```

Result: Program performed as expected, correct answer calculated

Boundary

Test number for the base of the triangle for valid input and Test for out of range numbers

```
C:\Users\Benjamin\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Benjamin/PycharmProjects/pythonProject1/new3.py
What would you like the base of your triangle to be:
-3
Try again, must be above 0
-2
Try again, must be above 0
3
What would you like the height of your triangle to be:
|
```

Result: Program performed as expected was not allowed to enter out of range numbers. This means that the program was formed correctly.

Boundary

Test number for the height of the triangle for valid input and Test for out of range numbers

```
C:\Users\Benjamin\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Benjamin/PycharmProjects/pythonProject1/new3.py
What would you like the base of your triangle to be:
-3
Try again, must be above 0
-2
Try again, must be above 0
3
What would you like the height of your triangle to be:
-3
Try again, must be above 0
-2
Try again, must be above 0
3
What would you like the radius of your circle to be:
|
```

Result: Program performed as expected was not allowed to enter out of range numbers. This means that the program was formed correctly.

Boundary

Test number of doors for valid input and Test for out of range numbers

```
1
2 Try again, must be above 0
3
4 What would you like the height of your triangle to be:
5
6 Try again, must be above 0
7
8 Try again, must be above 0
9
10 What would you like the radius of your circle to be:
11
12 Try again, must be above 0 or must be larger than the base and height of the triangle
13
14 Try again, must be above 0 or must be larger than the base and height of the triangle
15
16 The area of your triangle is 3.0
17 The area of the circle is: 113.11
18 The area of the shaded part of the circle is: 110.112
19
20 Program finished with no errors.
```

Result: Program performed as expected was not allowed to enter out of range numbers. This means that the program was formed correctly.

Exercise 3

a) Logical stages

- Prompt user to enter the first item for the shopping list
- Prompt user to enter a price for the first item
- Check number entered for the price is above 0 (if not back to pervious stage)
- Prompt user to enter the second item for the shopping list
- Prompt user to enter a price for the second item
- Check number entered for the price is above 0 (if not back to pervious stage)
- Prompt user to enter the second item for the shopping list
- Prompt user to enter a price for the second item
- Check number entered for the price is above 0 (if not back to pervious stage)
- Prompt user to enter the third item for the shopping list
- Prompt user to enter a price for the third item
- Check number entered for the price is above 0 (if not back to pervious stage)
- Prompt user to enter the fourth item for the shopping list
- Prompt user to enter a price for the fourth item
- Check number entered for the price is above 0 (if not back to pervious stage)
- Prompt user to enter the fifth item for the shopping list
- Prompt user to enter a price for the fifth item
- Check number entered for the price is above 0 (if not back to pervious stage)
- Calculate the total for all five items
- Calculate the total for all five items with staff discount
- Print result on the screen

```

b)
print("What would you like to add to your shopping list?:")
firstitem = input()
print("What is the price on the first item on your shopping list?:")
firstprice = float(input())
while(firstprice<=0):
    print("Try again, must be above 0")
    firstprice = float(input()) # Check to see if the price is a positive number and try again
print("What would you like to add to your shopping list?:")
seconditem = input()
print("What is the price on the second item on your shopping list?:")
secondprice = float(input())
while(secondprice<=0):
    print("Try again, must be above 0")
    secondprice = float(input()) # Check to see if the price is a positive number and try again
print("What would you like to add to your shopping list?:")
thirditem = input()
print("What is the price on the third item on your shopping list?:")
thirdprice = float(input())
while(thirdprice<=0):
    print("Try again, must be above 0")
    thirdprice = float(input()) # Check to see if the price is a positive number and try again
print("What would you like to add to your shopping list?:")
fourthitem = input()
print("What is the price on the fourth item on your shopping list?:")
fourthprice = float(input())
while(fourthprice<=0):
    print("Try again, must be above 0")
    fourthprice = float(input()) # Check to see if the price is a positive number and try again
print("What would you like to add to your shopping list?:")
fifthitem = input()
print("What is the price on the fifth item on your shopping list?:")
fifthprice = float(input())
while(fifthprice<=0):
    print("Try again, must be above 0")
    fifthprice = float(input()) # Check to see if the price is a positive number and try again
print("The products you have entered are below:")
print(firstitem, firstprice)
print(seconditem, secondprice)
print(thirditem, thirdprice)
print(fourthitem, fourthprice)
print(fifthitem, fifthprice)
total = firstprice + secondprice + thirdprice + fourthprice + fifthprice
print("The total price is", "£",total)
staffdiscount = 0.15
staffprice = total * (1 - staffdiscount)
print("The staff price is", staffprice)

```

c)
Normal values, within range

```
C:\Users\Benjamin\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Benjamin/PycharmProjects/pythonProject1/new2.py
What would you like to add to your shopping list?:
ham
What is the price on the first item on your shopping list?:
1.00
What would you like to add to your shopping list?:
cheese
What is the price on the second item on your shopping list?:
2.00
What would you like to add to your shopping list?:
red Bull
What is the price on the third item on your shopping list?:
1.29
What would you like to add to your shopping list?:
bread
What is the price on the fourth item on your shopping list?:
0.50
What would you like to add to your shopping list?:
milk
What is the price on the fifth item on your shopping list?:
1.29
The products you have entered are below:
ham 1.0
```

```
cheese 2.0
red Bull 1.29
bread 0.5
milk 1.29
The total price is £ 6.08
The staff price is 5.168
```

```
Process finished with exit code 0
```

Result: Program performed as expected, correct answer calculated

Boundary

Test number of doors for valid input and Test for out of range numbers

```
C:\Users\Benjamin\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Benjamin/PycharmProjects/pythonProject1/new2.py
What would you like to add to your shopping list?:
None
What is the price on the first item on your shopping list?:
0
Try again, must be above 0
-1
Try again, must be above 0
1.00
What would you like to add to your shopping list?:
|
```

```
C:\Users\Benjamin\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Benjamin/PycharmProjects/pythonProject1/new2.py
What would you like to add to your shopping list?:
None
What is the price on the first item on your shopping list?:
0
Try again, must be above 0
-1
Try again, must be above 0
1.00
What would you like to add to your shopping list?:
Break
What is the price on the second item on your shopping list?:
0
Try again, must be above 0
-1
Try again, must be above 0
1.00
What would you like to add to your shopping list?:
```

```
C:\Users\Benjamin\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Benjamin/PycharmProjects/pythonProject1/new2.py
What would you like to add to your shopping list?:
None
What is the price on the first item on your shopping list?:
0
Try again, must be above 0
-1
Try again, must be above 0
1.00
What would you like to add to your shopping list?:
Break
What is the price on the second item on your shopping list?:
0
Try again, must be above 0
-1
Try again, must be above 0
1.00
What would you like to add to your shopping list?:
Change
What is the price on the third item on your shopping list?:
0
Try again, must be above 0
-1
Try again, must be above 0
2.00
What would you like to add to your shopping list?:|
```

```
news news news
Try again, must be above 0
1.00
What would you like to add to your shopping list?:
Bread
What is the price on the second item on your shopping list?:
0
Try again, must be above 0
-3
Try again, must be above 0
-10
What would you like to add to your shopping list?:
Cheese
What is the price on the third item on your shopping list?:
0
Try again, must be above 0
-5
Try again, must be above 0
2.00
What would you like to add to your shopping list?:
Red Bull
What is the price on the fourth item on your shopping list?:
0
Try again, must be above 0
-100
Try again, must be above 0
1.20
What would you like to add to your shopping list?:
```

```
What would you like to add to your shopping list?:
Water
What is the price on the fifth item on your shopping list?:
0
Try again, must be above 0
-3
Try again, must be above 0
-1.00
Try again, must be above 0
1.00
The products you have entered are below:
Ham 0.75
Cheese 2.0
milk 1.09
bread 0.5
Water 1.0
The total price is £ 5.34
The staff price is 4.539
```

Result: Program performed as expected was not allowed to enter out of range numbers. This means that the program was formed correctly.

Exercise 4

a) Logical stages

Prompt the user to enter import the turtle
Prompt the use to bring the turtle up
Prompt the user to move the turtle forward by 90
Prompt the user to put the turtle down
Prompt the user to turn the turtle 90 degrees to the left
Prompt the user to move the turtle forward by 200
Prompt the user to turn to turtle right by 135 degrees
Prompt the user to move the turtle forward by 200
Prompt the user to turn to turtle left by 135 degrees
Prompt the user to move the turtle forward by 150
Prompt the user to turn the turtle 90 degrees to the right
Prompt the user to move the turtle forward by 45
Prompt the user to turn the turtle 90 degrees to the right
Prompt the user to move the turtle forward by 200
Prompt the user to turn the turtle 90 degrees to the right
Prompt the user to move the turtle forward by 45
Prompt the user to move the turtle right by 45 degrees
Prompt the user to move the turtle forward by 150
Prompt the user to turn to turtle left by 135 degrees
Prompt the user to move the turtle forward by 115
Prompt the user to turn the turtle 90 degrees to the right
Prompt the user to move the turtle forward by 38
Print result on the screen

b)

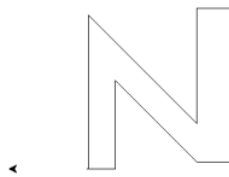
```
import turtle
myturt = turtle.Turtle()
myturt.penup()
myturt.forward(90)
myturt.pendown()
myturt.left(90)
myturt.forward(200)
myturt.right(135)
myturt.forward(200)
myturt.left(135)
myturt.forward(150)
myturt.right(90)
myturt.forward(45)
myturt.right(90)
myturt.forward(200)
myturt.right(90)
myturt.forward(45)
myturt.right(45)
myturt.forward(150)
myturt.left(135)
myturt.forward(115)
```

```
myturt.right(90)  
myturt.forward(38)
```

```
turtle.done()
```

c)

Normal values, within range



Result: Program performed as expected, the letter n came out correctly

If you was going to do this task at a later date I would consider trying to have a go at the rest of exercise 4 however I didn't feel comfortable with creating the o's

References

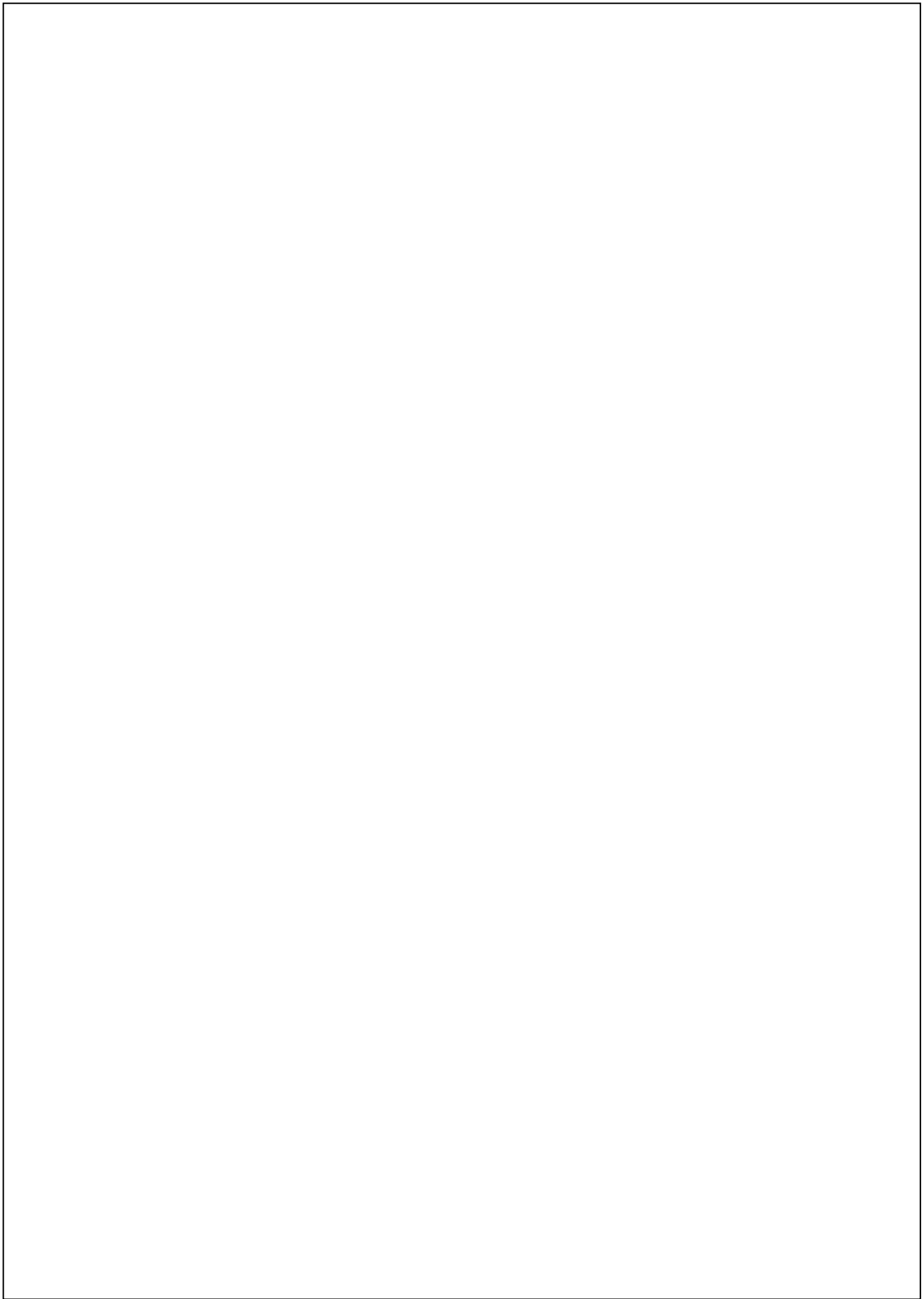
https://www.w3schools.com/python/ref_func_int.asp

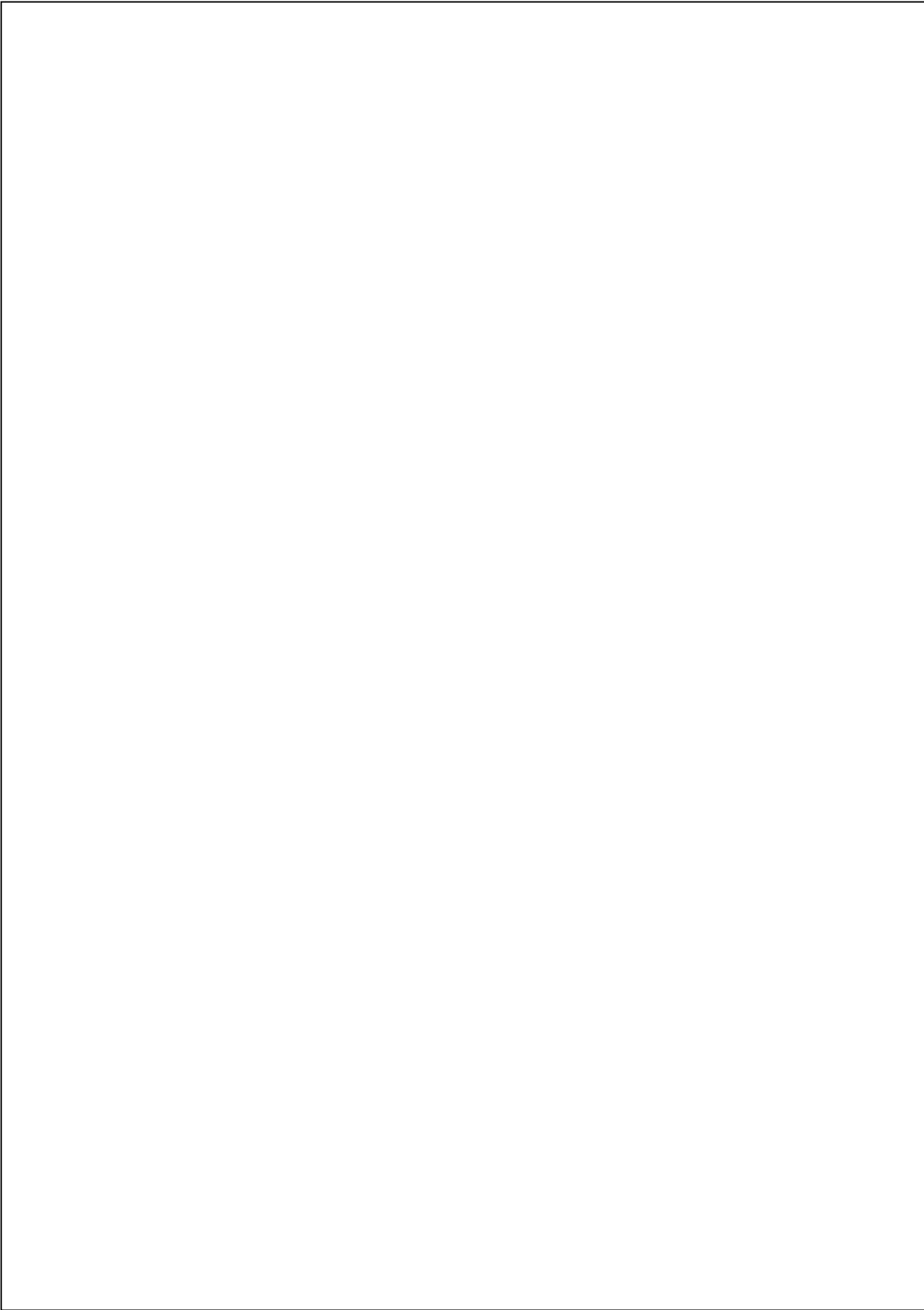
https://www.tutorialspoint.com/python/python_strings.htm

python programming: your beginners guide to learn python in 7 days by Maurice J. Thompson

Learn Python By Shyam Bharah, S.D

<https://www.scribd.com/document/321387359/1>





FINAL GRADE

66/100

GENERAL COMMENTS

Instructor

PART A

1. Variables - You have talked about the different types, of variable, but you need to talk about how variables are handled in Python ie inferred types. 2.5/5

2.If/Else - The work you need here is "decision". Otherwise a good explanation with suitable code examples. :) 4.5 /5

3. Loops - You need to be more explicit with a for loop ie that the number of iterations is known in advance of the loop starting. Otherwise a good explanation with suitable code examples 4/5

PART B

Exercise 1

Logical Stages/Testing - Logical stages are reasonable, but you have not included validation. Testing presented very well 4.5/5

Coding/Annotation - I might have made the mileage a float, but otherwise very good implementation with suitable validation. Well done. 9.5/10

Exercise 2

Logical Stages/Testing - Don't forget to number your logical stages. Well laid out otherwise. Testing is generally good, but you need a wider range of values (to test the relative sizes of triangle and circle (see below) 8/10

Coding/Annotation - Implementation is generally good with suitable validation. you need to think about the relative sizes of the triangle and circle (ie that the inner triangle cannot be larger than the circle) 8/10

Exercise 3

Logical Stages/Testing - Generally good, although same comment as above, number the stages.

Testing is OK, but see comments about lack of list use below. 7/10

Coding/Annotation - Unfortunately you haven't used a list which is required in the question. Therefore you have also not been able to demonstrate the use of a loop with the list. A working solution has been produced with validation, but the mark must be lower for this reason 8/15

Exercise 4 (Turtle)

Logical Stages/Testing - 5/10

Coding/Annotation - Unfortunately only an N for produced. You could use turtle's circle command to create the Os, and then a loop for the second O. 5/15

TOTAL: 66%

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