

## 03 - Selection Structures in Python

## Classifying Triangles

*A triangle can be classified based on the lengths of its sides as equilateral, isosceles or scalene. All three sides of an equilateral triangle have the same length. An isosceles triangle has two sides that are the same length, and a third side that is a different length. If all of the sides have different lengths then the triangle is scalene.*

*Write a program that reads the lengths of the three sides of a triangle from the user. Then display a message that states the triangle's type.*

*Sample Input 1*

60

60

60

*Sample Output 1*

*That's a equilateral triangle*

*Sample Input 2*

40

40

80

*Sample Output 2*

*That's a isosceles triangle*

*Sample Input 3*

50

60

70

*Sample Output 3*

*That's a scalene triangle*

For example:

Input	Result
60 60 60	<i>That's a equilateral triangle</i>
40 40 80	<i>That's a isosceles triangle</i>

### Program:

```
a=int(input())
```

```
b=int(input())
```

```
c=int(input())
```

```
if(a==b and b==c and c==a):
```

```
    print("That's", "a", "equilateral triangle")
```

```
elif(a!=b and a!=c and b!=c):
```

```
    print("That's", "a", "scalene triangle")
```

```
else:
```

```
    print("That's", "a", "isosceles triangle")
```

	Input	Expected	Got	
✓	60 60 60	That's a equilateral triangle	That's a equilateral triangle	✓
✓	40 40 80	That's a isosceles triangle	That's a isosceles triangle	✓
✓	50 60 70	That's a scalene triangle	That's a scalene triangle	✓
✓	50 50 80	That's a isosceles triangle	That's a isosceles triangle	✓
✓	10 10 10	That's a equilateral triangle	That's a equilateral triangle	✓

Ex. No. : 3.2

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## Vowel or Consonant

*In this exercise you will create a program that reads a letter of the alphabet from the user. If the user enters a, e, i, o or u then your program should display a message indicating that the entered letter is a vowel. If the user enters 'y' then your program should display a message indicating that sometimes y is a vowel, and sometimes y is a consonant. Otherwise your program should display a message indicating that the letter is a consonant.*

*Sample Input 1*

*i*

*Sample Output 1*

*It's a vowel.*

*Sample Input 2*

*y*

*Sample Output 2*

*Sometimes it's a vowel... Sometimes it's a consonant.*

*Sample Input 3*

*c*

*Sample Output 3*

*It's a consonant.*

For example:

Input	Result
y	<i>Sometimes it's a vowel... Sometimes it's a consonant.</i>
u	<i>It's a vowel.</i>
p	<i>It's a consonant.</i>

Program:

```
x=input()
```

```
if(x=='y'):
```

```
    print("Sometimes it's a vowel... Sometimes it's a consonant.")
```

```
elif(x=='a' or x=='e' or x=='i' or x=='o' or x=='u'):
```

```
    print("It's a vowel.")
```

```
else:
```

```
    print("It's a consonant.")
```

	Input	Expected	Got
✓	i	It's a vowel.	It's a vowel.
✓	y	Sometimes it's a vowel... Sometimes it's a consonant.	Sometimes it's a vowel...
✓	c	It's a consonant.	It's a consonant.
✓	e	It's a vowel.	It's a vowel.
✓	r	It's a consonant.	It's a consonant.

Ex. No. : 3.3

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## Electricity Bill

*Write a program to calculate and print the Electricity bill where the unit consumed by the user is given from test case. It prints the total amount the customer has to pay. The charge are as follows:*

<i>Unit</i>	<i>Charge / Unit</i>
<i>Upto 199</i>	<i>@1.20</i>
<i>200 and above but less than 400</i>	<i>@1.50 400</i>
<i>and above but less than 600</i>	<i>@1.80 600 and</i>
<i>above</i>	<i>@2.00</i>

*If bill exceeds Rs.400 then a surcharge of 15% will be charged and the minimum bill should be of Rs.100/-*

### *Sample Test Cases*

#### *Test Case 1*

*Input*

*50*

*Output*

*100.00*

#### *Test Case 2*

*Input*

*300*

*Output*

*517.50*

*For example:*

Input	Result
100.00	120.00

**Program:**

```
a=float(input())
if(a<200):
    b=a*1.20
    if(b<=100):
        b=100
        print(format(b,".2f"))
    else:
        print(format(b,".2f"))
elif(a>=200 and a<400):
    c=a*1.50
    if(c>=400):
        print(format(c*0.15+c,".2f"))
    else:
        print(format(c,".2f"))
elif(a>=400 and a<600):
    d=a*1.80
    print(format(d*0.15+d,".2f"))
elif(a>600):
```



```
e=a*2.00
```

```
print(format(e*0.15+e, ".2f"))
```

	Input	Expected	Got	
✓	50	100.00	100.00	✓
✓	100.00	120.00	120.00	✓
✓	500	1035.00	1035.00	✓
✓	700	1610.00	1610.00	✓

Ex. No. : 3.4

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## IN/OUT

*Ms. Sita, the faculty handling programming lab for you is very strict. Your seniors have told you that she will not allow you to enter the week's lab if you have not completed atleast half the number of problems given last week. Many of you didn't understand this statement and so they requested the good programmers from your batch to write a program to find whether a student will be allowed into a week's lab given the number of problems given last week and the number of problems solved by the student in that week.*

*Input Format:*

*Input consists of 2 integers.*

*The first integer corresponds to the number of problems given and the second integer corresponds to the number of problems solved.*

*Output Format:*

*Output consists of the string "IN" or "OUT".*

*Sample Input and Output:*

*Input*

*8*

*3*

*Output*

*OUT*

*For example:*

Input	Result
8 3	OUT

Program:

```
a=int(input())
```

```
b=int(input())
```

```
c=a//2
```

```
if(b>=c):
```

```
    print("IN")
```

```
else:
```

```
    print("OUT")
```

	Input	Expected	Got	
✓	8 3	OUT	OUT	✓
✓	8 5	IN	IN	✓
✓	20 9	OUT	OUT	✓
✓	50 31	IN	IN	✓

Ex. No. : 3.5

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## Second last digit

*Write a program that returns the second last digit of the given number. Second last digit is being referred to the digit in the tens place in the given number.*

*For example, if the given number is 197, the second last digit is 9.*

*Note1 - The second last digit should be returned as a positive number. i.e. if the given number is -197, the second last digit is 9.*

*Note2 - If the given number is a single digit number, then the second last digit does not exist. In such cases, the program should return -1. i.e. if the given number is 5, the second last digit should be returned as -1.*

For example:

Input	Result
197	9

Program:

```
a=int(input())
```

```
b=abs(a)
```

```
if(b>=10):
```

```
    c=b//10
```

```
    d=c%10
```

```
    print(d)
```

```
else:
```

```
    print(-1)
```

	Input	Expected	Got	
✓	197	9	9	✓
✓	-197	9	9	✓
✓	5	-1	-1	✓
✓	123456	5	5	✓
✓	8	-1	-1	✓

Ex. No. : 3.6

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## Chinese Zodiac

*The Chinese zodiac assigns animals to years in a 12 year cycle. One 12 year cycle is shown in the table below. The pattern repeats from there, with 2012 being another year of the dragon, and 1999 being another year of the hare.*

*Year Animal*

*2000 Dragon*

*2001 Snake*

*2002 Horse*

*2003 Sheep*

*2004 Monkey*

*2005 Rooster*

*2006 Dog*

*2007 Pig*

*2008 Rat*

*2009 Ox*

*2010 Tiger*

*2011 Hare*

*Write a program that reads a year from the user and displays the animal associated with that year. Your program should work correctly for any year greater than or equal to zero, not just the ones listed in the table.*

*Sample Input 1*

*2010*

*Sample Output 1*

*2010 is the year of the Tiger.*

*Sample Input 2*

*2020*

*Sample Output 2*

*2020 is the year of the Rat.*

Program:

```
a=int(input())  
b=a% 12  
if(b==0):  
    print(a,"is the year of the Monkey.")  
elif(b==1):  
    print(a,"is the year of the Rooster.")  
elif(b==2):  
    print(a,"is the year of the Dog.")  
elif(b==3):  
    print(a,"is the year of the Pig.")  
elif(b==4):  
    print(a,"is the year of the Rat.")  
elif(b==5):  
    print(a,"is the year of the Ox.")  
elif(b==6):  
    print(a,"is the year of the Tiger.")  
elif(b==7):  
    print(a,"is the year of the Hare.")  
elif(b==8):  
    print(a,"is the year of the Dragon.")  
elif(b==9):
```



```
print(a,"is the yaer of the Snake.")
```

```
elif(b==10):
```

```
    print(a,"is the year of the Horse.")
```

```
elif(b==11):
```

```
    print(a,"is the year of the Sheep.")
```

	Input	Expected	Got	
✓	2010	2010 is the year of the Tiger.	2010 is the year of the Tiger.	✓
✓	2020	2020 is the year of the Rat.	2020 is the year of the Rat.	✓

Ex. No. : 3.7

Date: 12.04.24

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## Pythagorean triple

*Three numbers form a Pythagorean triple if the sum of squares of two numbers is equal to the square of the third.*

*For example, 3, 5 and 4 form a Pythagorean triple, since  $3^2 + 4^2 = 25 = 5^2$ . You are given three integers, a, b, and c. They need not be given in increasing order. If they form a Pythagorean triple, then print "Yes", otherwise, print "No".*

*Sample Input*

3

5

4

*Sample Output*

yes

*Sample Test Cases*

*Test Case 1*

*Input*

3

5

4

*Output*

yes

*Test Case 2*

*Input*

5

8

2

*Output*

no

Program:

```
a=int(input())
```

```
b=int(input())
```

```
c=int(input())
```

```
if(a*a+b*b==c*c or b*b+c*c==a*a or c*c+a*a==b*b):
```

```
    print("yes")
```

```
else:
```

```
    print("no")
```

	Input	Expected	Got	
✓	3 5 4	yes	yes	✓
✓	5 8 2	no	no	✓

Ex. No. : 3.8

Date: 12.04.24

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## Leap Year

*Most years have 365 days. However, the time required for the Earth to orbit the Sun is actually slightly more than that. As a result, an extra day, February 29, is included in some years to correct for this difference. Such years are referred to as leap years. The rules for determining whether or not a year is a leap year follow:*

- Any year that is divisible by 400 is a leap year.
- Of the remaining years, any year that is divisible by 100 is not a leap year.
- Of the remaining years, any year that is divisible by 4 is a leap year.
- All other years are not leap years.

*Write a program that reads a year from the user and displays a message indicating whether or not it is a leap year.*

*Sample Input 1*

*1900*

*Sample Output 1*

*1900 is not a leap year.*

*Sample Input 2*

*2000*

*Sample Output 2*

*2000 is a leap year.*

Program:

```
a=int(input())
```

```
b=a%100
```

```
c=a%400
```

```
if(b==0):
```

```
    if(c==0):
```

```
        print(a,"is a leap year.")
```

```
    else:
```

```
print(a,"is not a leap year.")  
elif(a%4==0):  
    print(a,"is a leap year.")
```

	Input	Expected	Got	
✓	1900	1900 is not a leap year.	1900 is not a leap year.	✓
✓	2000	2000 is a leap year.	2000 is a leap year.	✓
✓	2100	2100 is not a leap year.	2100 is not a leap year.	✓
✓	2400	2400 is a leap year.	2400 is a leap year.	✓

Ex. No. : 3.9

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## Month name to days

*The length of a month varies from 28 to 31 days. In this exercise you will create a program that reads the name of a month from the user as a string. Then your program should display the number of days in that month. Display "28 or 29 days" for February so that leap years are addressed.*

*Sample Input 1*

*February Sample*

*Output 1*

*February has 28 or 29 days in it.*

*Sample Input 2*

*March*

*Sample Output 2*

*March has 31 days in it.*

*Sample Input 3*

*April*

*Sample Output 3*

*April has 30 days in it.*

**For example:**

Input	Result
February	February has 28 or 29 days in it.

Program:

```
odd=['January','March','May','July','August','October','December']
```

```
even=['April','June','September','November']
```

```
a=input()
```

```
if(a=='February'):
```

```
    print("February has 28 or 29 days in it.")
```

```
if a in odd:
```

```
    print(a,"has 31 days in it.")
```

```
if a in even:
```

```
    print(a,"has 30 days in it.")
```

	Input	Expected	Got	
✓	February	February has 28 or 29 days in it.	February has 28 or 29 days in it.	✓
✓	March	March has 31 days in it.	March has 31 days in it.	✓
✓	April	April has 30 days in it.	April has 30 days in it.	✓
✓	May	May has 31 days in it.	May has 31 days in it.	✓

Ex. No. : 3.10

Date: 12.04.24

Register No.: 231801118

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## Admission Eligibility

*Write a program to find the eligibility of admission for a professional course based on the following criteria:*

*Marks in Maths  $\geq 65$*

*Marks in Physics  $\geq 55$*

*Marks in Chemistry  $\geq 50$*

*Or*

*Total in all three subjects  $\geq 180$*

*Sample Test Cases*

*Test Case 1*

*Input*

*70*

*60*

*80*

*Output*

*The candidate is eligible*

*Test Case 2*

*Input*

*50*

*80*

*80*

*Output*

*The candidate is eligible*

*Test Case 3*

*Input*

*50*

*60*

*40*



### Output

*The candidate is not eligible*

For example:

Input	Result
50 80 80	<i>The candidate is eligible</i>

Program:

```
a=int(input())
```

```
b=int(input())
```

```
c=int(input())
```

```
if(a>=65 and b>=55 and c>=50):
```

```
    print("The candidate is eligible")
```

```
elif(a+b+c>=180):
```

```
    print("The candidate is eligible")
```

```
else:
```

```
    print("The candidate is not eligible")
```

	Input	Expected	Got	
✓	70 60 80	The candidate is eligible	The candidate is eligible	✓
✓	50 80 80	The candidate is eligible	The candidate is eligible	✓
✓	50 60 40	The candidate is not eligible	The candidate is not eligible	✓
✓	20 10 25	The candidate is not eligible	The candidate is not eligible	✓