8th chapter

Sub Module 1

PDF 1

'''
Write a program to test year is leap year or not

1) What is leap year ? ---> Divisible by 4 but not by 100 (or) divisble by 400
2) Are 2016 , 2020 , 2024 leap years ? ---> Yes becoz leap year for every 4 yearrs
3) Are 1700 , 1800 , 1900 leap years ? ---> No becoz no leap year for every 100 years
4) Are 1600 , 2000 , 2400 leap years ? ---> Yes becoz leap year for every 400 years
5) Hint: 3 conditions
'''

```
try:
 year = int(input('Enter 4-digit year : '))
 if year % 4 ==0 and year % 100 != 0 or year % 400 == 0:
  print('Leap year')
 else:
  print('Not a leap year')
except:
 print('Input should be an integer')
```

PDF 1a

Conditional statements
---
1) if statement
2) match statement

if statement flavors
---
1) if with else
2) if without else
3) if - elif - else
4) Nested if

PDF 1b

if with else
---

1) if condition:
        stmt1
        stmt2
        stmt3
  else:
        stmt4
   stmt5
   stmt6
  stmt7
2) Which statements are executed when condition is True ? ---> Statements 1 , 2 and 3
   Which statements are executed when condition is False ? ---> Statements 4 , 5 and 6
3) When is statement7 executed ? ---> Always executed irrespective of the condition becoz it is outside if
4) When is else suite executed ? ---> When if condition is false
   When is else suite skipped ? ---> When if condition is true
5) Are If and Else Valid ? ---> No becoz they are keywords and hence they should be in lowercase
6) if(condition):
        statement
   Can if condition be in () ? ---> Yes but () are optional for condition
7) if , else and stmt7 should be indented i.e. same column
Note:
op1 if cond: else: op2
Is the above statement valid ? ---> No becoz colons are not permitted in ternary operator

PDF 1c

if without else
---
1) if cond:
        stmt1
        stmt2
        stmt3
  stmt4
2) Which statements are executed when condition is True ? ---> Statements 1 , 2 , 3
   Which statements are executed when condition is False ? ---> Nothing becoz else suite is missing
3) When is stmt4 executed ? ---> Always executed irrespective of the condition becoz it is outside if
4) if and stmt4 should be indented

PDF 1d

if elif else
---
1) if cond1:
        stmt1

```
        stmt2
        stmt3
    elif cond2:
        stmt4
        stmt5
        stmt6
    elif cond3:
        stmt7
        stmt8
        stmt9
    else:
        stmt10
        stmt11
        stmt12
    stmt13
```

2) When are statements 1 , 2 and 3 executed ? ---> When cond1 is True
When are statements 4 , 5 and 6 executed ? ---> When cond1 is False and cond2 is True
When are statements 7 , 8 and 9 executed ? ---> When first two conditions are False and cond3 is True
When are statements 10 , 11 and 12 executed ? ---> When all the conditions are False

3) When is statement13 executed ? ---> Always executed irrespective of the conditions becoz it is outside if

4) What is else + if called ? ---> elif

5) if , elif , else and stmt13 should be indented i.e. same column

PDF 1e

Dis-advantage of else and if

```
if cond1:
 stmt1
 stmt2
 stmt3
else:
 if cond2:
  stmt4
  stmt5
  stmt6
 else:
  if cond3:
   stmt7
   stmt8
   stmt9
  else:
   stmt10
   stmt11
```

```
  stmt12
stmt13
```
What is the issue when else and if are used separately instead of elif ? --->
No readability and clarity due to too many indentations

PDF 2

```
'''
Write a program to determine largest of three numbers with if and else
Hint: Write multiple conditions
'''
try:
 a = eval(input('Enter 1st input : '))
 b = eval(input('Enter 2nd input : '))
 c = eval(input('Enter 3rd input : '))
 if a > b and a > c:
  print('Laregst number : ' , a)
 elif b > c:
  print('Laregst number : ' , b)
 else:
  print('Laregst number : ' , c)
except NameError:
 print('Input string should be in quotes')
except TypeError:
 print('Input can not be a complex number')
```

PDF 2a

```
# Identify error
else: # Error becoz if is missing
  print('else suite')
print('Outside')
'''
```
1) Can else suite be used without if ? ---> No
2) In other words, 'if' is mandatory for every else suite
3) if cond:
stmt1
stmt2
stmt3
Is the above if valid ? ---> Yes i.e. if can be used without else suite
```
'''
```

PDF 2b

```
# Identify error
if 9 > 5 # Error becoz : is missing
 print('Hello')
print('Bye')
'''
What is the rule for if ? ---> : is mandatory at the end of if
'''
```

PDF 2c

```
# Identify error
if 9 > 12:
 print('Hyd')
else # Error becoz : is missing
 print('Sec')
'''
What is the rule for else ? ---> : is mandatory at the end of else
'''
```

PDF 2d

```
# Identify error
if (10,20,15):
print('Hyd') # Error becoz spacebar(or) tab key is missing at the begining of stmt
else:
print('Sec') # Error becoz spacebar(or) tab key is missing at the begining of stmt
'''
What is the rule for : ? ---> At least one spacebar (or) tab key is mandatory at the begining of next line
'''
```

PDF 2e

```
# Identify error
if ():
   print('Hyd')
 else: # Error becoz else is not indented with if
     print('Sec')
print('Bye')
'''
1) What is another rule for else ? ---> It should be indented with if
2) if condition:
        stmt1
          stmt2
          stmt3
    else:
```

```
    stmt4
            stmt5
            stmt6
  Is the above if valid ? ---> Yes becoz statements of if suite and else suite need not be indented
'''

PDF 2f

# Identify error
if { }:
{ # Error due to {
 print('One')
 print('Two')
 print('Three')
} # Error due to }
else:
{ # Error due to {
 print('Four')
 print('Five')
 print('Six')
} # Error due to }
print('Bye')
'''
Can statements of if suite and else suite be in braces ? --->
        No becoz braces are used for set and dictionary but not for suite (i.e. statements)
'''

PDF 2g

# Identify error
if ():
 print('One')
 print('Two')
 print('Three')
else:
if []: # Error becoz spaces are missing before the statement
 print('Four')
 print('Five')
 print('Six')
else:
if {}: # Error becoz spaces are missing before the statement
 print('Seven')
 print('Eight')
 print('Nine')
else:
```

```
 print('Hyd')
 print('Sec')
 print('Cyb')
print('Bye')
```

PDF 3

```
'''
Write a program to convert celsius temperature to farenheit and vice-versa
1) What is the formula to convert celsius to farenheit ? ---> 1.8 * temp + 32
2) What is the formula to convert farenheit to celsius ? ---> (temp - 32) / 1.8
'''
try:
 ch = int(input('Enter 1 to convert celsius to farenheit and 2 to convert fahrenheit to celsius : '))
 if ch == 1:
  c = float(input('Enter celsius temperature : ')) # 30
  print('Fahrenheit Equivalent : ' , 1.8 * c + 32)
 elif ch ==2:
  f= float(input('Enter fahrenheit temperature : '))
  print(F'celsius equivalent : {(f-32)/1.8:.2f}')
 else:
  print('Invalid input')
except:
 print('Input should be a number')


# Write a program to determine a number is even or odd with if statement
try:
 n = int(input('Enter any integer : '))
 if n % 2 == 0:
  print('Even number')
 else
  print('Odd number')
except:
 print('Input should be integer')
```

PDF 4

```
'''
Write a program to test a point (x , y) lies in 1st quadrant , 2nd quadrant , 3rd quadrant ,
4th quadrant , x - axis , y - axis or origin
1) What are the values of x and y in 1st quadrant ? ---> Both are +ve
```

2) What are the values of x and y in 2nd quadrant ? ---> 'x' is -ve and 'y' is +ve
3) What are the values of x and y in 3rd quadrant ? ---> Both are -ve
4) What are the values of x and y in 4th quadrant ? ---> 'x' is +ve and 'y' is -ve
5) What are the values of x and y on x - axis ? ---> 'x' is non-zero and 'y' is 0
6) What are the values of x and y on y - axis ? ---> 'x' is 0 and 'y' is non-zero
7) What are the values of x and y if point is origin ? ---> Both are zeroes
8) Hint: Use if .. elif
'''

```
x = float(input('Enter value of x co-ordinate : '))
y = float(input('Enter value of y co-ordinate : '))
if x > 0 and y > 0:
  print('1st quadrant')
elif x < 0 and y > 0:
  print('2nd quadrant')
elif x < 0 and y < 0:
  print('3rd quadrant')
elif x > 0 and y < 0:
  print('4th quadrant')
elif x != 0 and y == 0:
  print('X axis')
elif x == 0 and y != 0:
  print('Y axis')
else:
 print('Origin')
```

```
# Find outputs
if(10 , 20 , 30): # True due to non-empty tuple
 print('Hyd') # Hyd
 print('Sec') # Sec
 print('Cyb') # Cyb
else:
 print('One')
 print('Two')
 print('Three')
print('Bye') # Bye
```

'''
Which of the following is True (or) False ?
1) [10 , 20 , 30] ---> True due to non-empty list
2) [ ] ---> False due to empty list
3) list() ---> False due to empty list
4) (40 , 50) ---> True due to non-empty tuple
5) ( ) ---> False due to empty tuple
6) tuple() ---> False due to empty tuple
7) {60} ---> True due to non-empty set

8) { } ---> False due to empty dictionary
9) set() ---> False due to empty set
10) {10 : 20 , 30 : 40} ---> True due to non-empty dictionary
11) dict() ---> False due to empty dictionary
12) 'Hyd' ---> True due to non-empty string
13) '' ---> False due to empty string
14) (25) ---> True due to non-zero integer
15) 0 ---> False due to 0
16) -72 ---> True due to non-zero integer
17) (38,) ---> True due to non-empty tuple
18) 4j ---> True due to non-zero imag
19) 0j ---> False due to 0 imag
20) 3 + 0j ---> True due to non-zero real
21) 10.8 ---> True due to non-zero number
22) 0.0 ---> False
23) -25.6 ---> True due to non-zero number
'''

PDF 5

'''
Write a program to determine largest , smallest and middle of three numbers
a = 10
b = 20
c = 7
max = 20
min = 7
mid = (10 + 20 + 7) - (20 + 7) = 37 - 27 = 10
1) What is the initial value of max ? ---> a
2) Whichever input > max, copy that input to max
3) What is the initial value of min ? ---> 'a'
4) Whichever input < min, copy that input to min
5) How to obtain middle number ? ---> Eliminate max and min from a , b , c
'''
a = float(input('Enter first input : '))
b = float(input('Enter second input : '))
c = float(input('Enter third input : '))
max = a
if b > max:
 max = b
if c > max:
 max = c
min = a
if b < min:

```
 min = b
if c < min:
 min = c
mid = (a + b + c) - (max + min)
print('Largest number : ' , max)
print('Smallest number : ' , min)
print('Middle number : ' , mid)



# Find outputs (Home work)
if(): # False due to empty tuple
        print('Hyd')
        print('Sec')
        print('Cyb')
else:
        print('One') # One
        print('Two') # Two
        print('Three') # Three
print('Bye') # Bye
```

PDF 6

```
'''
Write a program to determine three sides form a triangle or not
1) Find area if it is an equilateral triangle
   What is an equilateral triangle ? ---> All the three sides should be same
   What is the area of equilateral triangle ? ---> sqrt(3) / 4 * a ^ 2
2) Find perimeter if it is an isosceles triangle
   What is an isoscles triangle ? ---> Any two sides are same
   What is the perimeter of isoscles triangle ? ---> a + b + c
3) Find both if it is scalene triangle
   What is a scalene triangle ? ---> All the three sides are different
   What is the area of scalene triangle ? ---> sqrt(s * (s - a) * (s - b) * (s - c))
 What is the value of 's' ? ---> (a + b + c) / 2
   What is the perimeter of scalene triangle ? ---> a + b + c
4) What is the qualification of triangle ? ---> Sum of every two sides should be > 3rd side
5) Hint: Use nested if
'''
import math
a = float(input('Enter 1st side : ')) # 3
b = float(input('Enter 2nd side : ')) # 4
c = float(input('Enter 3rd side : ')) # 5
if a + b >= c and b + c >= a and c + a >= b:
 if a == b == c:
  print('Equilateral triangle')
```

```
  area = math . sqrt(3) / 4 * a * a
  print(F'Area : {area:.2f}')
 elif a == b or b == c or a == c:
  print('Isoscles triangle')
  p = a + b + c
  print(F'Perimeter : {p}')
 else:
  print('Scalene triangle')
  s = (a + b + c) / 2 # 6
  area = math . sqrt(s * (s - a) * (s - b) * (s - c))
  print(F'Area : {area:.2f}')
  print(F'Perimeter : {2 * s}')
else:
 print('Not a triangle')
```

PDF 7

```
# Find outputs (Home work)
if { }: # False due to empty dictionary
 print('Hyd')
 print('Sec')
 print('Cyb')
print('Bye') # Bye
```

```
'''
Write a program to determine roots of a quadtratic equation a * x ^ 2 + b * x + c = 0 where a ! = 0
1) What is the value of discriminant ? ---> b ^ 2 - 4ac
2) What are the roots called if disc > 0 ? ---> Real and distinct
    What is the formula for root1 ? ---> (-b + sqrt(disc)) / 2a
    What is the formula for root2 ? ---> (-b - sqrt(disc)) / 2a
3) What are the roots called if disc is 0 ? ---> Real and same
    What is the formula for root ? ---> -b / 2a
4) What are the roots called if disc < 0 ? ---> Complex (or) Imaginary roots
    What is the formula for real part ? ---> -b / 2a
  What is the formula for imag part ? ---> sqrt(-disc) / 2a
  What is root1 if real part is 3 and imag part is 4 ? ---> 3 + 4j
  What is root2 if real part is 3 and imag part is 4 ? ---> 3 - 4j
'''
import math
a = float(input('Enter value of a : '))
if a == 0:
 print('Value of a can not be 0')
 exit()
```

```
b = float(input('Enter value of b : '))
c = float(input('Enter value of c : '))
disc = b ** 2 - 4 * a * c
if disc > 0:
 print('Roots are real and distinct')
 root1 = (-b + math . sqrt(disc)) / (2 * a)
 root2 = (-b - math . sqrt(disc)) / (2 * a)
 print(F'Root 1 : {root1:.2f}')
 print(F'Root 2 : {root2:.2f}')
elif disc < 0:
 print('Roots are imaginary (or) complex')
 real = -b / (2 * a)
 imag= math . sqrt(-disc) / (2 * a)
 print(F'Root 1 : {real} + {imag}j')
 print(F'Root 2 : {real} - {imag}j')
else:
 print('Roots are real and equal')
 root = -b / (2 * a)
 print(F'Root 1 : {root}')
 print(F'Root 2 : {root}')
```

PDF 8

```
'''
Write a program to determine a point (x , y) lies inside , outside or on the circle.
Center is origin and radius is 'r'
1) What is the distance between origin and point (x , y) ? ---> sqrt(x ^ 2 + y ^ 2)
2) Where is the point if distance > raidus ? ---> Outside the circle
3) Where is the point if distance < raidus ? ---> Inside the circle
4) Where is the point if distance and raidus are same ? ---> On the circle
'''
import math
x = float(input('Enter value of x : ')) # 3
y = float(input('Enter value of y : ')) # 4
r = float(input('Enter radius of circle : ')) # 5
d = math . sqrt(x ** 2 + y ** 2) # 5
if d > r:
 print('Point is outside the circle')
elif d < r:
 print('Point is inside the circle')
else:
 print('Point is on the circle')
```

```
# Write a program to print month name for input month number by using if and elif (Home work)
try:
 a = int(input('Enter month number (1 - 12): '))
 if a == 1:
  print('January')
 elif a == 2:
  print('Febraury')
 elif a == 3:
  print('March')
 elif a == 4:
  print('April')
 elif a == 5:
  print('May')
 elif a == 6:
  print('June')
 elif a == 7:
  print('july')
 elif a == 8:
  print('August')
 elif a == 9:
  print('September')
 elif a == 10:
  print('October')
 elif a == 11:
  print('November')
 elif a == 12:
  print('December')
 else:
  print('Input should be between 1 and 12')
except:
  print('Input should be an integer')
```