Decision Making Statements (if, if-else, if-elif-else)

Statements	Syntax	Example	Definition

if	if condition:
	statement1
	statement2
		i = 10
		if (i > 15):
		print ("10 is less than 15")
		print ("I am Not in if")
		
		Output:
		`I am Not in if`
			if statement is the most simple decision making statement. It is used to decide whether a certain statement or block of statements will be executed or not

If - else	if (condition):
	statement1
	else:
	statement2
		i = 20;
		if (i < 15):
		print ("i is smaller than 15")
		print ("i'm in if Block")
		else:
		print ("i is greater than 15")
		print ("i'm in else Block")
		print ("i'm not in if and not in else Block")
		
		Output:
		i is greater than 15
		i'm in else Block
		i'm not in if and not in else Block
			We can use the else statement with if statement to execute a block of code when the condition is false.

nested-if	if (condition1):
	statement
	if (condition2):
	statement
	# if Block is end here
	# if Block is end here
		i = 10
		if (i == 10):
		if (i < 15):
		print ("i is smaller than 15")
		if (i < 12):
		print ("i is smaller than 12 too")
		else:
		print ("i is greater than 15")
		
		Output:
		i is smaller than 15
		i is smaller than 12 too
			A nested if is an if statement that is the target of another if statement. Nested if statements means an if statement inside another if statement.

if-elif-else	if (condition):
	  statement
	elif (condition):
	  statement
	  .
	  .
	else:
	  statement
		i = 20
		if (i == 10):
		  print ("i is 10")
		elif (i == 15):
		  print ("i is 15")
		elif (i == 20):
		  print ("i is 20")
		else:
		  print ("i is not present")
		
		Output:
		i is 20
			Here, a user can decide among multiple options. The if statements are executed from the top down. As soon as one of the conditions controlling the if is true, the statement associated with that if is executed, and the rest of the ladder is bypassed.

1. Predict the output:

```
a = 12

if a > 6:
    print ("Value in a is", a)

print("End of program.")
```

```
output: Value in a is 12
End of program.
```

2. Predict the output:

```
if 2==1:
     print("True")
else:
    print("False")
```

```
output: False
```

3. Complete the fill in the blank "---" in the "if" statement to make a complete program to verify whether "y" is leap year or not:

```
print("Enter the Year: ")
y = int(input())

if y%4==0 and ---:
    print("\nIt is a leap Year")
elif y%400==0:
    print("\nIt is a leap Year")
else:
    print("\nIt is not a leap Year")
```

Ans: y%100 != 0

4. Write an algorithm that perform simple grading scheme according to the given below table.

LETTER GRADE S	RANGE OF NUMERIC GRADE
A	All grades above 89
B	All grades above 79 and below 90
C	All grades above 69 and below 80
D	All grades above 59 and below 70
F	All grades below 60

Solution:

```
#accept a test score as input and print out the corresponding letter grade
testScore = float(input("Enter a test score from 0 to 100: "))
# conditional statement to determine and print the test letter grade
if testScore >= 90:
     print("your grade is A")
elif testScore >= 80:
     print("your grade is B")
elif testScore >= 70:
     print("your grade is C")
elif testScore >= 60:
     print("your grade is D")
else:
     print("your grade is F")
```

5. You have your grades (any number between 0 to 100). Instructor will increase your grades by 4 if your existing grades is even and it is divisible by 4 too. Instructor will increase your grades by 3 if your existing grades is odd and "grades -1" is divisible by 4. Otherwise, Instructor will not change you grades. Write a program to perform this operation

Enter your grades marks: 68
New grades = 72 (because 68 is even and it is divisible by 4 too)

Enter your grades marks: 67
New grades = 67 (because 67 is odd and "67 - 1" is not divisible by 4)

Enter your grades marks: 69
New grades = 72 (because 69 is odd and "69 - 1" is divisible by 4)

Solution:

```
#accept a test score as input and print out the corresponding letter grade
testScore = float(input("Enter a test score from 0 to 100: "))
# conditional statement to determine and print the test letter grade
if (testScore % 2 == 0) and (testScore % 4 == 0):
    testScore = testScore + 4
else:
    if (testScore - 1)%4 == 0:
         testScore = testScore +3
    else:
        testScore = testScore

print(testScore)
```

7. Enter the radius of a circle. If the radius is greater than 0, calculate and print the area and circumference of the circle. If user enter A, P and D, outputs are area, parameters and diameter, respectively

Solution:

```
radius=eval(input("Enter Radius of circle: "))
pi = 3.14
if radius>0:
        area=radius**2*pi
        print("Area of CIrcle is = ", format (area, ".2f"))
        circumference=2*pi*radius
        print("Circumference of Circle is = ", format (circumference, ".2f"))
a=input("Enter character:")
if a=='A':
        print("Area of CIrcle is = ", format (area, ".2f"))
elif a=='P':
        print("Circumference of Circle is = ", format (circumference, ".2f"))
elif a=='D':
        print("Diameter is=", format(radius*2, ".2f"))
else:
        print("Wrong value entered")
```

8. Find the output of the following:

a)

```
a=20
a*=5==5 and 6>=23>>3
print(a)
output:20
```

b)

```
a=20
a*=5!=5 and 6>=100>>2
print(a)
output:0
```

c)

```
a=20
a*=5!=5 or 6>=10>>2
print(a)
output:20
```

d)

```
a=10
a/=5!=5 and 6>=100>>2
print(a)

Traceback (most recent call last):
File "<string>", line 2, in <module>
```

```
ZeroDivisionError: division by zero
```

e)

```
a=50<=55 and 6>=10 and 2
print(a)
output: False
```

f)

```
a=20
a = 50 or 55 and 6<=10 and 20%2
print(a)
output: 50
```

g)

```
a=20
a = int(5^5 or 55 and 6>=10 and 2*2)
print(a)
output:0
```

9. What will be the output of the following programs:

a)

```
Thislist = ["Apple", "Banna", "Cherry"]
Thislist[1] = "blackcurrant"
print(Thislist)
output: ['Apple', 'blackcurrant', 'Cherry']
```

b)

```
Thislist = ["Apple", "Banna", "Cherry"]
Thislist.insert(2, "orange")
print(Thislist)
output: ['Apple', 'Banna', 'orange', 'Cherry']
```

c)

```
Thislist = ["Apple", "Banna", "Cherry"]
mylist = Thislist.copy()
print(Thislist)
print(mylist)
output: ['Apple', 'Banna', 'Cherry']
        ['Apple', 'Banna', 'Cherry']
```

d)

```
Thislist = ['B', 'E', 'N', 'N', 'E','T','T']
print("Initial List: ", Thislist)
Sliced_Thislist = Thislist[:5]
print(Sliced_Thislist)
```

output: ['B', 'E', 'N', 'N', 'E']

e)

```
lst=[[1,2,3],'hello',[3,4,5,6]]
print(lst[1][1])
print(lst[2][1])
print(lst[1])
print(lst[0])
lst[2][:2]=[1,1]
print(lst)
print(lst[0][1])
```

Output: e
4
hello
[1, 2, 3]
[[1, 2, 3], 'hello', [1, 1, 5, 6]]
2

10. What will be output of the following statements?

```
a = 8 b = 4
print(a & b)
print(a | b)
print(~a)
print(a ^ b)
print(a >> 2)
print(a << 2)
```

Output: 0
12
-9
12
2
32

Explain all the output.