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RANDOM NUMBERS

Using Random Module

- Python has a module namely random that provides random – number generators. Random number means any number generated within the given range.
- To generate random number in Python we have to import random module
- 3 most common method to generate random number in python are :
  - random() function
  - randint(a,b) function
  - randrange(a,b) function

random() function

- It is floating point random number generator between 0.0 to 1.0. here lower limit is inclusive where as upper limit is less than 1.0.
- 0<=N<1
- Examples:

```
>>> import random
>>> a = random.random()
>>> print(a)
0.0888880146536
>>>
```

Output is less than 1

random() function

- To generate random number between given range of values using random(), the following format should be used:
  - Lower_range + random() * (upper_range-lower_range)
  - For example to generate number between 10 to 50:
    - 10 + random() * (40)

randint() function

- Another way to generate random number is randint() function, but it generate integer numbers.
- Both the given range values are inclusive i.e. if we generate random number as :
  - randint(20,70)
    - In above example random number between 20 to 70 will be taken. (including 20 and 70 also)

```
>>> import random
>>> a = random.randint(10,20)
>>> print(a)
18
>>>
```

EXAMPLE

```
import random
count=3
ans='y'
win=False
print("Guess what number computer generated between 20-30")
print("Total 3 chances are there ")
print("-----------------------------------------------")
while ans=='y':
        num1 = random.randint(20,30)
        print("Change Remaining :",count)
        guess = int(input("Enter your answer :"))
        if num1 == guess:
                print("Congratulation! you guessed it right")
                win=True
        else:
                print("Wrong!")
                count-=1
                if count==0:
                        print("Oops! You lost all your chances ")
                        print("Number was :",num1)
        if win==True or count==0:
                ans=input("Play Again?")
                if ans=='y':
                        count=3
                        win=False
```

OUTPUT

```
Guess what number computer generated between 20-30
Total 3 chances are there
--------------------------------------------------
Change Remaining : 3
Enter your answer :21
Wrong!
Change Remaining : 2
Enter your answer :22
Wrong!
Change Remaining : 1
Enter your answer :23
Wrong!
Oops! You lost all your chances
Number was : 25
Play Again?y
```

```
Change Remaining : 3
Enter your answer :28
Wrong!
Change Remaining : 2
Enter your answer :27
Wrong!
Change Remaining : 1
Enter your answer :29
Congratulation! you guessed it right
Play Again?n
```

Just a Minute…

- Give the following python code, which is repeated four times. What could be the possible set of output(s) out of four sets (ddd is any combination of digits)

```
import random
print(15 + random.random()*5)
```

a)	b)	c)	d)
17.ddd 19.ddd 20.ddd 15.ddd	15.ddd 17.ddd 19.ddd 18.ddd	14.ddd 16.ddd 18.ddd 20.ddd	15.ddd 15.ddd 15.ddd 15.ddd

Just a Minute…

- What could be the minimum possible and maximum possible numbers by following code

```
import random
print(random.randint(3,10)-3)
```

- In a school fest, three randomly chosen students out of 100 students (having roll number 1 -100) have to present the bouquet to the guests. Help the school authorities choose three students randomly

Just a Minute…

What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the minimum values that can be assigned to each of the variables BEGIN and LAST.

```
import random

VALUES=[10,20,30,40,50,60,70,80];
BEGIN=random.randint(1,3)
LAST =random.randint(BEGIN,4)

for I in range(BEGIN,LAST+1):
    print VALUES[I],"-",
```

(i) 30 - 40 - 50 -	(ii) 10 - 20 - 30 - 40 -
(iii) 30 - 40 - 50 - 60 -	(iv) 30 - 40 - 50 - 60 - 70 -

Just a Minute…

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Look at the following Python code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable PICKER.

Note:

- Assume all the required header files are already being included in the code.
- The function randint() generates an integer between 1 to n

```
import random
PICKER=1+random.randint(0,2)
COLOR=["BLUE","PINK","GREEN","RED"]
for I in range(1,PICKER+1):
        for j in range(I+1):
                print(COLOR[j],end='')
        print()
```

(i)	BLUEPINK	(ii)	PINKGREEN	(iii)	BLUE	(iv)	BLUEPINK
	BLUEPINKGREEN		PINKGREENRED		BLUEPINK		BLUEPINKGREEN
					BLUEPINKGREEN		BLUEPINKGREENRED

What are the possible outcome(s) executed from the following code? Also specify the maximum and minimum values that can be assigned to variable PICK

```
import random
PICK = random.randint(0,3)
CITY = ["DELHI","MUMBAI","CHENNAI","KOLKATA"]
for i in CITY:
    for j in range(1,PICK):
        print(I,end="")
    print()
```

1) DELHIDELHI MUMBAIMUMBAI CHENNAICHENNAI KOLKATAKOLKATA	2) DELHI DELHIMUMBAI DELHIMUMBAICHENNAI
3) DELHI MUMBAI CHENNAI KOKLATA	4) DELHI DELHIMUMBAI KOLKATAKOLKATAKOLKATA

randrange() function

- This function is also used to generate random number within given range.
- Syntax
  - randrange(start,stop,step)

```
import random
n1 = random.randrange(5,15)
n2 = random.randrange(5,15)
n3 = random.randrange(5,15)
n4 = random.randrange(5,15)
print(n1,n2,n3,n4)
```

It will generate random number between 5 to 14

```
11 8 5 12
```

random output between 5 to 14, may vary

randrange() function

```
import random
for i in range(20):
        n1 = random.randrange(1,30,2)
        print(n1, end='\t')
```

It will generate random number between 1 to 29 with stepping of 2 i.e. it will generate number with gap of 2 i.e. 1,3,5,7 and so on

```
25      11      15      9       3       7       19      13      17      7
27      11      27      5       21      7       17      9       25      7
```

Mathematics Game for Kids

```
import random
operators = ['+','*','-']
error = 0
score = 0
print("############ WELCOME TO SIMPLE CALCULATION GAME ###############")
print("Rule : +4 for correct answer, -2 for wrong answer ")

for i in range(5):
        print("*"*50)
        n1 = random.randrange(1,100)
        n2 = random.randrange(1,100)
        i = random.randrange(0,3)
        op = operators[i]
        result = 0
        if op=='+':
                result = n1 + n2
        elif op=='-':
                if n1<n2:
                        n1,n2=n2,n1
                result = n1 - n2
        elif op=='*':
                result = n1 * n2
        print(n1,op,n2,'=')
        ask = int(input())
        if ask == result:
                score+=4
        else:
                score-=2
print("*"*50)
print("## YOU SCORED : ",score, " ##")
```

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for i in range(5):
        print("*"*50)
        n1 = random.randrange(1,100)
        n2 = random.randrange(1,100)
        i = random.randrange(0,3)
        op = operators[i]
        result = 0
        if op=='+':
                result = n1 + n2
        elif op=='-':
                if n1<n2:
                        n1,n2=n2,n1
                result = n1 - n2
        elif op=='*':
                result = n1 * n2
        print(n1,op,n2,'=')
        ask = int(input())
        if ask == result:
                score+=4
        else:
                score-=2
print("*"*50)
print("## YOU SCORED : ",score, " ##")
```

```
############ WELCOME TO SIMPLE CALCULATION GAME ###############
Rule : +4 for correct answer, -2 for wrong answer
**************************************************
93 * 50 =
11
**************************************************
29 + 29 =
58
**************************************************
80 + 22 =
102
**************************************************
61 - 25 =
36
**************************************************
43 - 43 =
0
**************************************************
## YOU SCORED :  14  ##
```

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