## Importing necessary modules

In [18]:
```
from itertools import permutations,combinations,combinations_with_replacement
```

## Task1: To find number of ways 5 people can be selected from 12 where one is always selected

In [4]:
```
num=[i for i in range(1,11)]
len(list(combinations(num,4)))*5
```

Out[4]: 1050

## Task2: car parking

In [7]:
```
total=150
cars=80
lorry=20
vans=50

print("probabilit of van leaving first =",vans/total," or 1/3")
print("probability of lorry leaving first=",lorry/total," or 2/15")
print("probability of car leaving second = ",cars/(total-1)," or 80/149")
```

```
probabilit of van leaving first = 0.3333333333333333  or 1/3
probability of lorry leaving first= 0.13333333333333333  or 2/15
probability of car leaving second =  0.5369127516778524  or 80/149
```

## Task3: classroom problem

In [10]:
```
total_classes=30
left_0=1
left_1=2
left_2=8
left_3=5
left_4=12
left_5=2

print("Probability of class having two left handed students = ",left_2/total_classes," or 4/15")
print("Probability of class having atleast 3 left handed students = ",(left_3+left_4+left_5)/total_classes," or 19/30")


```

```
Probability of class having two left handed students =  0.26666666666666666  or 4/15
Probability of class having atleast 3 left handed students =  0.6333333333333333  or 19/30
```

## Task4: The square problem probability of point lying inside the triangle ABR

In [14]:
```
#lets take x as 2
x=2
area_sq=(2*x)**2
#finding the area of the triangle ABR we have calculated it to be 2 for values x=2
area_triangle=2
print("proabability of point lying inside triangle is =",area_triangle/area_sq," or 1/8")
```

```
proabability of point lying inside triangle is = 0.125  or 1/8
```

## Task5: Dice problem

In [30]:
```
dice=[1,2,3,4,5,6]
ns=len(list(combinations(dice,1)))*len(list(combinations(dice,1)))
print("probability of getting pairs sum to zero is = 0")
print("probality og getting pairs sum less than 13 is = 1")
# The sum of pairs is 4
combs=list(combinations_with_replacement(dice,2))
count=0
for item in combs:
    if(sum(item)==4):
        count+=1
print("Probability of getting a pair sum to 4 = ",count*2/len(combs)," or 1/9")
```

```
probability of getting pairs sum to zero is = 0
probality og getting pairs sum less than 13 is = 1
Probability of getting a pair sum to 4 =  0.19047619047619047  or 1/9
```

## Task6: Tickets problem

In [32]:
```
numb=[i for i in range(1,21)]
count=0
count1=0
count2=0
for i in numb:
    if(i%2==0):
        count+=1
    if(i%3==0):
        count1+=1
    if(i%5==0):
        count2+=1
print("Probability of finding even number = ",count/20)
print("Probability of finding number divisible by 3= ",count1/20)
print("Probability of finding prime is = ",8/20)
print("Probability of finding number divisible by 5 = ",count2/20)
```

```
Probability of finding even number =  0.5
Probability of finding number divisible by 3=  0.3
Probability of finding prime is =  0.4
Probability of finding number divisible by 5 =  0.2
```

## Task7 : henry wants to bet

In [35]:
```
count11=0
count12=0
for item in combs:
    if(sum(item)==11):
        count11+=1
    if(sum(item)==12):
        count12+=1
print(count11*2,count12*2)
print("Probability of getting these pairs are same = ",2/36," or 1/18")

```

```
2 2
Probability of getting these pairs are same =  0.05555555555555555  or 1/18
```