EXERCISE

Exercise #1

Two fair dice are rolled, one red and one blue, and sum of the number showing face up is computed. How may ways that

a) The sum is 4 or 11

b) At least one dice shows the number 3

c) The red dice shows the number 3

d) None of the outcome of the dice shows the number 3

Two fair dice are rolled, one red and one blue, and sum of the number showing face up is computed. How may ways that

a) The sum is 4 or 11

T_1 case (1 and 3) $= 1 \times 1$
$= 1$

T_2 case (2 and 2) $= 1 \times 1$
$= 1$

T_3 case (3 and 1) $= 1 \times 1$
$= 1$

$= 3$ ways

T_1 case (5 and 6) $= 1 \times 1$
$= 1$

T_2 case (6 and 5) $= 1 \times 1$
$= 1$

$= 2$ ways

$3 + 2 = 5$ ways ※

b) At least one dice shows the number 3

T_1 (Red 3) $= 1 \times 5$ (R, B)
$= 5$ ways

T_2 (blue 3) $= 5 \times 1$
$= 5$ ways

T_3 (blue 3 red 3) $= 1 \times 1$
$= 1$ ways

$5 + 5 + 1 = 11$ ways

c) The red dice shows the number 3

Red (3) $= 1 \times 6$
$= 6$ ways

d) None of the outcome of the dice shows the number 3

Red $\neq 3$ blue $\neq 3 = 5 \times 5$
$= 25$ ways

Exercise # 2

a) How many 8-bit string that has bit 1 only one
b) How many 8-bit string that has bit 1 at least one
c) how many 8-bit string that begins and ends with bit-1
d) How many eight-bit strings have either the second or the fourth bit 1(or both)?

a) How many 8-bit string that has bit 1 only one

$= 1 \times 1 \times 1 \times 1 \times 1 \times 1 \times 1 \times 1$

$= 8$ ways

b) How many 8-bit string that has bit 1 at least one

00000000 = 1 only

so $2^8 = 256$

$256 - 1 = 255$

c) how many 8-bit string that begins and ends with bit-1

$1 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 1 = 64$ ways

d) How many eight-bit strings have either the second or the fourth bit 1(or both)?

Exercise # 3

26

- How many license plates of 2 letters from A to Z, followed by 3 digits from 0 to 9 can be made, if repetition of letters is not allowed?

$$26 \times 25 \times 10 \times 10 \times 10 = 650\,000$$

Exercise #4

- In how many ways can we select two books from different subjects among five distinct computer science books, three distinct mathematics books, and two distinct art books?

T_1 (Computer and Math) $= 5 \times 3$
$= 15$

T_2 (Computer and Art) $= 5 \times 2$
$= 10$

T_3 (Math and Art) $= 3 \times 2$
$= 6$

Total = 31 ways

Exercise #5

Given three sets of integers; **A**={1, 3, 5}, **B** = {4, 6} and **C** = {0, 2,7,9}. How many ways are there to choose one integer from set **A**, **B**, or **C**?

$3 + 2 + 4 = 9$

Exercise #6

- In how many ways can five people A, B, C, D, and E be seated around a circular table if

  a) A and B must sit next to each other

  b) A and B must not sit next to each other

  c) A and B must be together and CD must be together

- In how many ways can five people A, B, C, D, and E be seated around a circular table if

a) A and B must sit next to each other

$$(4-1)!\,2!$$

$$= 3!\,2!$$

$$= 12 \text{ ways}$$

b) A and B must not sit next to each other

Total = 24

AB together = 12

24 − 12 = 12

c) A and B must be together and CD must be together

$$(3-1)!\,2!\,2!$$

$$= 2!\,2!\,2!$$

$$= 8 \text{ ways}$$

Exercise #7

1. How many words, with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if
   i) 4 letters are used at a time ,
   ii) all letters are used at a time
   iii) All letters are used but first letter is vowel

2. One hundred twelve people bought raffle tickets to enter a random drawing for three prizes. How many ways can three names be drawn for first prize, second and third prize?
3. In how many ways can the letter of the word 'JUDGE' be arranged such that the vowels always come together?

1. How many words, with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if

   i) 4 letters are used at a time ,

   $6 \times 5 \times 4 \times 3 = 360$ ways

   ii) all letters are used at a time

   $6! = 720$ ways

   iii) All letters are used but first letter is vowel

   $2 \times 5 \times 4 \times 3 \times 2 \times 1 = 240$ ways

2. One hundred twelve people bought raffle tickets to enter a random drawing for three prizes. How many ways can three names be drawn for first prize, second and third prize?

   $112 \times 111 \times 110 = 1367520$ ways

3. In how many ways can the letter of the word 'JUDGE' be arranged such that the vowels always come together?

   $4!2! = 48$ ways