Exercises - Chapter: 01

* Exercise 1.1: Number System Conversion

Convert the following number from base 2 to base 10: 1001001100

Solution 1.1:

Using Expansion method, we have:

1001001100_2

$= 1 \times 2^9 + 0 \times 2^8 + 0 \times 2^7 + 1 \times 2^6 + 0 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0$

$= 512 + 64 + 8 + 4$

$= 588_{10}$

From here, $1001001100_2 = 588_{10}$

* Exercise 1.2: Number System Conversion

Convert the following number from base 16 to base 8: 1056

Solution 1.2:

- Step 1: Conversion To Base 10: $1056_{16} \rightarrow (\ ? \ )_{10}$

$1056_{16} = 1 \times 16^3 + 0 \times 16^2 + 5 \times 16^1 + 6 \times 16^0$

$= 4096 + 0 + 80 + 6$

$= 4182_{10}$

From here, $1056_{16} = 4182_{10}$

- Step 2: Conversion To Base 8: $4182_{10} \rightarrow (\ ? \ )_8$

Using Division method, we have:

From here, $4182_{10} = 10126_8$

Thus, $1056_{16} = 10126_8$

* Exercise 1.3: Number System Conversion

Convert the following numbers from base 8 to base 16: 11672

Solution 1.3:

- Step 1: Conversion To Base 10: $11672_8 \rightarrow$ (?)$_{10}$

$11672_8 = 1 \times 8^4 + 1 \times 8^3 + 6 \times 8^2 + 7 \times 8^1 + 2 \times 8^0$

$\qquad = 4096 + 512 + 384 + 56 + 2$

$\qquad = 5050_{10}$

From here, $11672_8 = 5050_{10}$

- Step 2: Conversion To Base 16: $5050_{10} \rightarrow$ (?)$_{16}$

Using Division method, we have:

From here, $5050_{10} = 13BA_{16}$

Thus, $11672_8 = 13BA_{16}$

* Exercise 1.4: Designing algorithm with pseudocode and flowchart

Find the sum of first N natural numbers.

Example:

N=10

sum = 0+1+2+3+4+5+6+7+8+9=45

Solution 1.4:

-Pseudocode:

Step 1: Start

Step 2: Assign i=0 and sum=0

Step 3: Read limit of number: N

Step 4: Repeat steps 5 to 6 until i=N-1 reached

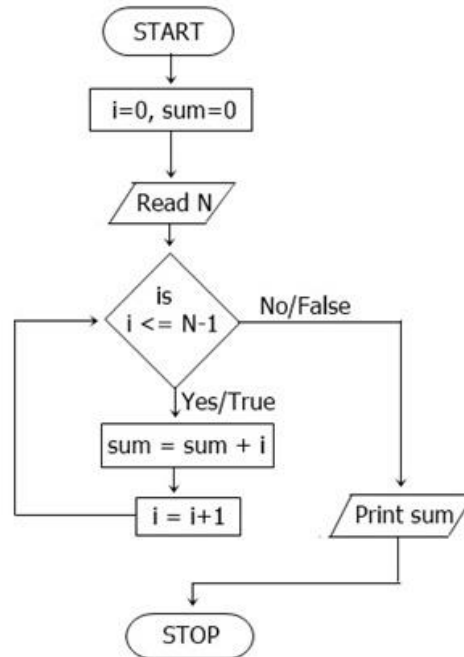**Step 5:** Compute sum=sum+i

Step 6: Compute i=i+1

Step 7: Print sum

Step 8: Stop

-Flowchart:

* Exercise 1.5: Designing algorithm with pseudocode and flowchart

Print the largest of any three numbers.

Example:

a=10, b=5, c=7

Result: 10

Solution 1.5:

-Pseudocode:

Step 1: Start

Step 2: Read three numbers and store them in a, b, c

Step 3: Is a > b:

Yes: Go to Step 6

No: Go to Step 4

Step 4: Is b > c:

Yes: Print b is greatest

No: Go to step 5

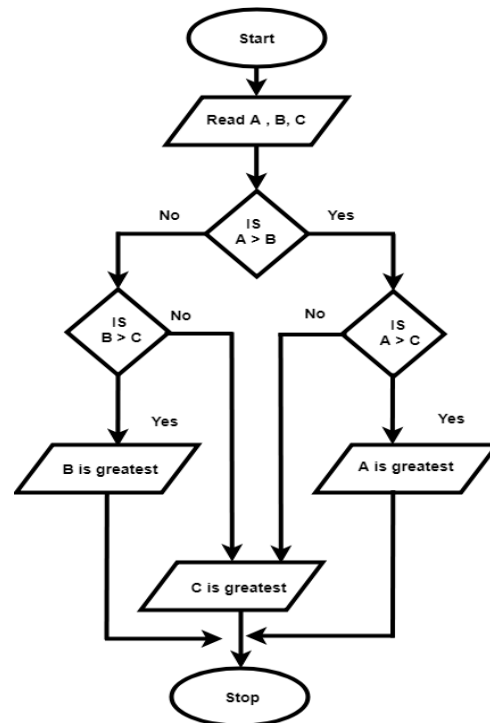**Step 5**: Print c is greatest and go to Step 8

Step 6: Is a > c:

Yes: Print a is greatest

No: Go to step 7

Step 7: Print c is greatest and go to step 8

Step 8: Stop

-Flowchart:

* **Exercise 1.6: Number System Conversion**

Convert the following numbers from base 2 to base 10:

11111

1011011101

* **Exercise 1.7: Number System Conversion**

Convert the following numbers from base 10 to base 2:

1256

10988

* **Exercise 1.8: Number System Conversion**

Convert the following numbers from base 2 to base 16:

10011001

1101101111110101

* Exercise 1.9: Number System Conversion

Convert the following numbers from base 16 to base 2:

ABC7

1789A

* Exercise 1.10: Number System Conversion

Convert the following numbers from base 10 to base 16:

2020

172.983

* Exercise 1.11: Designing algorithm with pseudocode and flowchart

Find Area and Perimeter of:

- Square

- Rectangle

- Circle

- Triangle

* Exercise 1.12: Designing algorithm with pseudocode and flowchart

Swap two numbers using temporary variable.

* Exercise 1.13: Designing algorithm with pseudocode and flowchart

Find even numbers between 1 to N.

N is a positive Integer.

* Exercise 1.14: Designing algorithm with pseudocode and flowchart

Find sum of series 1+3+5+…..+N.

N is positive odd Integer.

* Exercise 1.15: Designing algorithm with pseudocode and flowchart

Find the Fibonacci series till term≤1000.