**Assignment-7 Final Sort and GCD**

**Group: 10**

**Group Members:** P Datta Ksheeraj 21CS30037

Marla Mayukha 21CS10041

**Semester:** Autumn Session- 2023

**SORT:** Registers R1 to R10 contain the values to be sorted. The pseudo code is as follows:

R12 = 0;

R13 = R12 – 9;

N:

If( R13 > 0 ) Branch to M;

R11 = R10 – R9

BPL R11 M1

R11 = R10

R10 = R9

R9 = R11

M1:

R11 = R9 – R8

BPL R11 M2

R11 = R9

R9 = R8

R8 = R11

M2:

R11 = R8 – R7

BPL R11 M3

R11 = R8

R8 = R7

R7 = R11

M3:

R11 = R7 – R6

BPL R11 M4

R11 = R7

R7 = R6

R6 = R11

M4:

R11 = R6 – R5

BPL R11 M5

R11 = R6

R6 = R5

R5 = R11

M5:

R11 = R5 – R4

BPL R11 M6

R11 = R5

R5 = R4

R4 = R11

M6:

R11 = R4 – R3

BPL R11 M7

R11 = R4

R4 = R3

R3 = R11

M7:

R11 = R3 – R2

BPL R11 M8

R11 = R3

R3 = R2

R2 = R11

M8:

R11 = R2 – R1

BPL R11 M9

R11 = R2

R2 = R1

R1 = R11

M9:

R12 = R12 + 1

BR N

M:

HALT

**GCD:**

We followed Euclidean Algorithm to find gcd of two positive numbers. We keep subtracting smaller number from bigger number until both numbers become the same, which itself is the gcd.

Let R1 = a, R2 = b

Pseudo code:

R3 = R1 – R2

L1:

BLT R3 M

BZ R3 N

L2:

R1 = R1 – R2

R3 = R1 -R2

R4 = R2 – R1

BR L1

M:

R2 = R2 – R1

R3 = R1 – R2

R4 = R2 – R1

BR L1

N:

R5 = R1