**Worksheet - 1**

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**Branch:** BE CSE **Section/Group:** 20BCS\_WM\_707-B

**Semester:** 5 **Date of Performance:** 23/08/2022

**Subject Name:** Design & Analysis of Algorithm **Subject Code:** 20CSP-312

**1. Aim/Overview of the practical:**

Euclid GCD Algorithm.

**2. Algorithm/ Which logistics used:**

**A. By modulus:**

1. Take x, y as parameters,
2. Check if y is equals to 0 otherwise go to 4.,
3. Give back x,
4. Call A function with parameters as y and x modulus y (y % x).
5. **By subtraction:**
6. Take x, y as parameters,
7. Check if y is equals to 0 otherwise go to 4.,
8. Give back x,
9. Check if one of the parameter is zero otherwise go to 6.,
10. Give back non-zero parameter,
11. Check if x is greater than y otherwise go to 8.,
12. Call B function with parameters as y and x minus y (x - y),
13. Call B function with parameters as y minus x (y - x) and x.

**3. Code:**

#include <bits/stdc++.h>

using namespace std;

int gcdOhcfM(int x, int y){

if(y == 0){

return x;

}else{

gcdOhcfM(y, x%y);

}

}

int gcdOhcfS(int x, int y){

if(x == y){

return x;

}else if(x == 0){

return y;

}else if(y == 0){

return x;

}else if(x>y){

gcdOhcfS(y, x-y);

}else{

gcdOhcfS(y-x, x);

}

}

int main(){

int a, b;

cin>>a>>b;

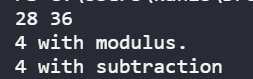
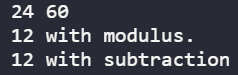
cout<<gcdOhcfM(a, b)<<" with modulus.\n";

cout<<gcdOhcfS(a, b)<<" with subtraction\n";

return 0;

}

**5. Result/Output:**

**Learning outcomes (What I have learnt):**

1. Understood the Euclid theorem used for calculating the GCD of two numbers.
2. Learnt about the recursive nature of GCD algorithm by modulus and subtraction.

**Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):**

|  |  |  |  |
| --- | --- | --- | --- |
| Sr. No. | Parameters | Marks Obtained | Maximum Marks |
| 1. |  |  |  |
| 2. |  |  |  |
| 3. |  |  |  |