

## Practical no: 6A

Name: Saloni Vishwakarma

Batch-Roll no: C1-13

Subject: Cryptography Lab

Date of execution: 16 June 2023

**Aim:** Implement the following methods to support cryptography algorithms.

a) Euler's Phi-Function

**a) Euler's Phi-Function (Code and Output):**

```
#include <stdio.h>
int gcd(int a, int b)
{
    if (b == 0)
        return a;
    return gcd(b, a % b);
}

int eulerTotient(int n)
{
    int count = 0;
    int i;
    for ( i = 1; i < n; i++)
    {
        if (gcd(n, i) == 1)
            count++;
    }
    return count;
}

void printCoprimes(int n)
{
    printf("\n Coprimes with respect to %d are: ", n);
    int i;
    for ( i = 1; i < n; i++) {
        if (gcd(n, i) == 1)
            printf("%d ", i);
    }
}
```

```

    }
    printf("\n\n");
}
int main()
{
    int n;
    printf("\n Enter a number: ");
    scanf("%d", &n);
    int totient = eulerTotient(n);
    printf("\n Euler's Totient function of %d is %d\n", n, totient);
    printCoprimes(n);
    return 0;
}

```

```

Enter a number: 57

Euler's Totient function of 57 is 36

Coprimes with respect to 57 are: 1 2 4 5 7 8 10 11 13 14 16 17 20 22 23 25 26 28 29 31 32 34 35 37 40 41 43 44 46 47 49
50 52 53 55 56

Process returned 0 (0x0)   execution time : 6.022 s
Press any key to continue.
|

```

```

Enter a number: 23

Euler's Totient function of 23 is 22

Coprimes with respect to 23 are: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

Process returned 0 (0x0)   execution time : 4.983 s
Press any key to continue.
|

```

Conclusion: We have successfully studied and implemented Euler's Phi-function (prime and non-prime number) which supports the algorithms used in cryptography in C.