Midterm Examination

Fundamentals of Computing and Programming
BMath First Year
Indian Statistical Institute, Bangalore Centre

Date: 12th September, 2025, Friday | Time: 2-5 pm

Total Marks: 35

Problem 1 - (4 marks)

What is the output of the following program?

```c
#include<stdio.h>

int f(int a)
{
    int b = 0;
    while (a != 0)
    {
        b = b * 10 + a % 10;
        a = a / 10;
    }
    return b;
}
int main(void)
{
    int n = f(24589);
    printf("%d\n", n);
    return 0;
}
```

Problem 2 - (4 marks)

What is the output of the following program?

```c
#include<stdio.h>

int f(int a, int b)
{
    return b == 0 ? 1 : a * f(a, b-1);
}
int main(void)
{
    printf("%d\n", f(2, 8));
    return 0;
}
```

Problem 3 - (4 marks)

What is the output of the following program? Explain your answer in a few lines.

```c
#include<stdio.h>

void f(float u, int x, float y)
{
    x = (int) u;
    y = u - x;
    printf("%d %f\n", x, y);
}
int main(void)
{
    int x = 0;
    float y = 2.78;
    f(2.78, x, y);
    printf("%d %f\n", x, y);
    return 0;
}
```

Problem 4 - (4 marks)

What is the output of the following program? Explain your answer in a few lines.

```c
#include<stdio.h>

void f(int a)
{
    if (a != 0)
    {
        f(a / 2);
        putchar('0' + a % 2);
     }
}

int main(void)
{
    f(11);
}
```

Problem 5 - (5 marks)

Write a program that asks the user to enter two integers, then calculates their greatest common divisor (GCD) using Euclid's Algorithm.

Problem 6 - (7 marks)

The sum of the primes below 10 is $2 + 3 + 5 + 7 = 17$. Write a program that finds the sum of all primes below $1,00,000$.

Problem 7 - (7 marks)

Write a program that asks the user to enter a positive number, and it prints a table showing how many times each digit appears in the number.