

Lab Assignment 6

Exercise 1

Write a program in C to find the square of any number using a function.

```
#include <stdio.h>

// Function declaration: This tells the compiler that the function exists.
double calculateSquare(double num);

int main() {
    double number, square;

    // Get input from the user
    printf("Enter a number: ");
    scanf("%lf", &number);

    // Call the function to calculate the square
    square = calculateSquare(number);

    // Print the result
    printf("The square of %.2lf is %.2lf\n", number, square);

    return 0;
}

// Function definition: This is where the function's code is written.
double calculateSquare(double num) {
    return num * num;
}
```

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Exercise 2

What is the expected output of the following program?

```
1
2  #include <math.h>
3  #include <stdio.h>
4
5
6  int main()
7  {
8      double Number;
9      Number = 49;
10
11     double squareRoot = sqrt(Number);
12
13     printf("The Square root of %.21f = %.21f",
14           Number, squareRoot);
15     return 0;
16 }
```

The Square root of 49.00 = 7.00

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Exercise 3

Write a function to check whether a number is a prime number or not.

```
#include <stdio.h>
#include <stdbool.h> // Include the stdbool.h header for using 'true' and 'false'

// Function declaration: Checks if a number is prime
bool isPrime(int n);

int main() {
    int number;

    // Get input from the user
    printf("Enter a positive integer: ");
    scanf("%d", &number);

    // Check if the number is prime and print the result
    if (isPrime(number)) {
        printf("%d is a prime number.\n", number);
    } else {
        printf("%d is not a prime number.\n", number);
    }

    return 0;
}

// Function definition: Implements the primality check
bool isPrime(int n) {
    if (n <= 1) {
        return false; // 1 and numbers less than 1 are not prime
    }
    if (n <= 3) {
        return true; // 2 and 3 are prime
    }
    if (n % 2 == 0 || n % 3 == 0) {
        return false; // Numbers divisible by 2 or 3 are not prime
    }

    // Optimized primality test: Check divisors up to the square root of n
    for (int i = 5; i * i <= n; i = i + 6) {
        if (n % i == 0 || n % (i + 2) == 0) {
            return false;
        }
    }

    return true; // If no divisors are found, the number is prime
}
```

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