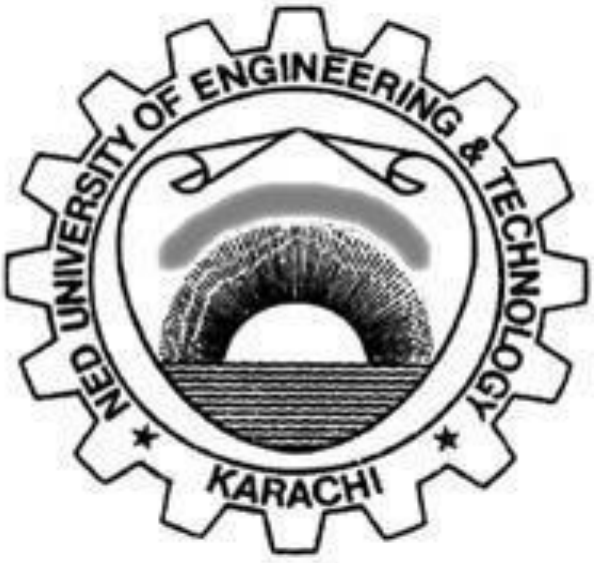
Practical Workbook

CT-175
PROGRAMMING FUNDAMENTALS



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EXERCISE Q# 01

Write a C program that takes two integer values as input from the user. Then swap the values taken from the user and display the output of the variables.

```
#include<stdio.h>
int main(){
int p, q, temp;
printf("Enter first number: ");
scanf("%d", &p);
printf("Enter second number: ");
scanf("%d", &q);
 printf("\nBefore swappping: p=%d, q=%d\n",p,q);
temp=p;
p=q;
q=temp;
printf("\nAfter swapping: p=%d, q=%d", p,q);
return 0;     }
```

RESULT:

```
Enter first number: 1
Enter second number: 2

Before swappping: p=1, q=2

After swapping: p=2, q=1
```

EXERCISE Q# 02

A customer asks the IT firm to develop a program in C language, which can take tax rate and salary from the user on runtime and then calculate the tax, the user has to pay and the salary he/she will have after paying the tax. This information is then provided to the user.

```
#include<stdio.h>
int main(){
float salary,tax_rate,tax,salary_after_tax;
printf("Enter your salary: ");
scanf("%f", &salary);
 printf("Enter tax rate: ");
```

```
scanf("%f", &tax_rate);
 tax= (tax_rate/100)*salary;
salary_after_tax= salary- tax;
 printf("\nThe tax to be paid: %f ",tax);
printf("\nThe salary after paying tax: %f ",salary_after_tax);
return 0;

}
```

RESULT:

```
Enter your salary: 50000
Enter tax rate: 25

The tax to be paid: 12500.000000
The salary after paying tax: 37500.000000
```

EXERCISE Q# 03

A car traveled for some hours. The time car traveled is taken at run time of the program, and it must not be negative and must be between one to five hours. The car had not traveled same distance in each hour. The distance that the car covered must not be negative. Write a C Program that computes the Average Speed of the Car in miles per hour. Hint: the restrictions can be displayed in the form of message on the window.

```
#include<stdio.h>
 int main() {
 int hour;
 float distance, average_speed, total_distance = 0;
 printf("Enter hours: ");
scanf("%d", &hour);
 if (hour < 1 || hour > 5) {
printf("Invalid hours\n");
return 1;
    }
 else {
for (int i = 1; i <= hour; i++) {
  printf("Enter positive distance for hour %d: ",i);
scanf("%f", &distance);
 if (distance < 0) {
printf("Invalid distance\n");
return 1;
            }
```

```
            total_distance +=distance;
        }
    }
    average_speed = total_distance / hour;
        printf("Total distance covered by the car = %f miles\n", total_distance);
printf("Average speed of the car in miles per hour = %f\n", average_speed);
return 0;
}
```

OUTPUT

```
Enter hours: 2
Enter positive distance for hour 1: 20
Enter positive distance for hour 2: 10
Total distance covered by the car = 30.000000 miles
Average speed of the car in miles per hour = 15.000000
```

EXERCISE Q# 04

Explain the output of this C program. Why the wrong value is being displayed in the output?

EXPLANATION:-

The output shows an incorrect value for testInteger because the integer value used, 3000000000, exceeds the range of an int data type in C, which typically holds values between -2147483648 and 2147483647 for a 32-bit system. Since 3000000000 is outside this range, the integer overflows, resulting in an incorrect negative value being displayed.

In C, when an integer value exceeds the maximum range, it wraps around due to the two's complement representation, which explains why the displayed value is incorrect.

To avoid this, you should use a larger data type, such as long, long int, which can hold larger values.

EXERCISE Q# 05

Construct a C program with the flowchart below. The input value of the principle must be between 100 Rs. To 1,000,000 Rs. The Rate of interest must be between 5% to 10% and Time Period must be between 1 to 10 years. Hint: these restrictions can be displayed in the form of message on the window.

```
#include <stdio.h>
int main() {
    float principal, rate, time, interest;
     do {
        printf("Enter the Principal amount (between 100 rs. and 1,000,000 rs.): ");
        scanf("%f", &principal);
        if (principal < 100 || principal > 1000000) {
            printf("Invalid input. Principal must be between 100 rs. and 1,000,000
rs.\n");
        }
    } while (principal < 100 || principal > 1000000);

    do {
        printf("Enter the Rate of Interest (between 5%% and 10%%): ");
        scanf("%f", &rate);
        if (rate < 5 || rate > 10) {
            printf("Invalid input. Rate of interest must be between 5%% and
10%%.\n");
        }
    } while (rate < 5 || rate > 10);

    do {
        printf("Enter the Time Period (in years, between 1 and 10): ");
        scanf("%f", &time);
        if (time < 1 || time > 10) {
```

```
            printf("Invalid input. Time period must be between 1 and 10 years.\n");
        }
    } while (time < 1 || time > 10);

    interest = (principal * rate * time) / 100;
    printf("The Simple Interest is: %f rs.\n", interest);

    return 0;
}
```

OUTPUT:

```
Enter the Principal amount (between 100rs and 1,000,000rs): 20000
Enter the Rate of Interest (between 5% and 10%): 6
Enter the Time Period (in years, between 1 and 10): 5
The Simple Interest is: 6000.000000 rs.
```