NAME : SUBHRANIL NANDY

ROLL NO.: 2022ITB012

GROUP: HX

1. WAP to calculate the sum of the squares of those numbers only whose LSD is five, falling between two numbers taken as user input. Print the numbers satisfying the constraints, their squares, and the sum on the terminal.

Code:

```c
// Print sum of squares of nos. with LSD = 5
#include <stdio.h>

int main()
{
    int a, b, i, sum = 0;
    printf("Enter the starting and stopping integers : ");
    scanf("%d %d", &a, &b);

    printf("The numbers(LSD = 5) with their corresponding
          squares:\n");
    for (i = a + 1; i < b; i++)
    {
        if (i % 10 == 5)
        {
            printf("%d --- %d\n", i, i * i);
            sum += i * i;
        }
    }
    printf("The sum of their squares = %d\n", sum);
    return 0;
}
```

Outputs:

```
student@student-HP-ProDesk-600-G5-MT:~/2022ITB012/Assignment2$ gcc 12_a2_1.c
student@student-HP-ProDesk-600-G5-MT:~/2022ITB012/Assignment2$ ./a.out
Enter the starting and stopping integers : 10 100
The numbers(LSD = 5) with their corresponding squares :
15 --- 225
25 --- 625
35 --- 1225
45 --- 2025
55 --- 3025
65 --- 4225
75 --- 5625
85 --- 7225
95 --- 9025
The sum of their squares = 33225
student@student-HP-ProDesk-600-G5-MT:~/2022ITB012/Assignment2$
```

```
student@student-HP-ProDesk-600-G5-MT:~/2022ITB012/Assignment2$ ./a.out
Enter the starting and stopping integers : 2 50
The numbers(LSD = 5) with their corresponding squares :
5 --- 25
15 --- 225
25 --- 625
35 --- 1225
45 --- 2025
The sum of their squares = 4125
```

2. WAP to convert decimal to A. Binary, B. Octal, and C. Hexadecimal numbers using CASE statement.

Code:

```c
// Conversion to other bases
#include <stdio.h>
#include <string.h>

long int convert_bin(int);
int convert_oct(int);
void convert_hex(int, char *);
int main()
{
    int ch, dec;
    char hex[15];
    printf("Enter the decimal number : ");
    scanf("%d", &dec);
    printf("1. Convert to Binary\n");
    printf("2. Convert to Octal\n");
```

```
    printf("3. Convert to Hexadecimal\n");
    printf("Enter your choice no. : ");
    scanf("%d", &ch);

    switch (ch)
    {
    case 1:
        printf("The Binary equivalent of %d is %ld\n", dec,
               convert_bin(dec));
        break;
    case 2:
        printf("The Octal equivalent of %d is %d\n", dec,
               convert_oct(dec));
        break;
    case 3:
        convert_hex(dec, hex);
        printf("The Hexadecimal equivalent of %d is %s\n",
               dec, hex);
        break;
    default:
        printf("Wrong choice.Exiting...\n");
    }

    return 0;
}
long int convert_bin(int dec)
{
    long int bin = 0;
    int pos = 1;
    while (dec != 0)
    {
        bin = (dec % 2) * pos + bin;
        pos *= 10;
        dec /= 2;
    }
    return bin;
}
```

```c
int convert_oct(int dec)
{
    int oct = 0;
    int pos = 1;
    while (dec != 0)
    {
        oct = (dec % 8) * pos + oct;
        pos *= 10;
        dec /= 8;
    }
    return oct;
}

void convert_hex(int dec, char *hex)
{
    int rem, i = 0;
    while (dec != 0)
    {
        rem = dec % 16;
        if (rem < 10)
            hex[i] = rem + 48;
        else
            hex[i] = 'A' + (rem % 10);
        i++;
        dec /= 16;
    }
    hex[i] = '\0';
    // Reversing the digits
    char c;
    for (i = 0; i < strlen(hex) / 2; i++)
    {
        c = hex[i];
        hex[i] = hex[strlen(hex) - i - 1];
        hex[strlen(hex) - i - 1] = c;
    }
}
```

Outputs:

```
student@student-HP-ProDesk-600-G5-MT:~/2022ITB012/Assignment2$ gcc 12_a2_2.c
student@student-HP-ProDesk-600-G5-MT:~/2022ITB012/Assignment2$ ./a.out
Enter the decimal number : 67
1. Convert to Binary
2. Convert to Octal
3. Convert to Hexadecimal
Enter your choice no. : 1
The Binary equivalent of 67 is 1000011
```

```
student@student-HP-ProDesk-600-G5-MT:~/2022ITB012/Assignment2$ ./a.out
Enter the decimal number : 67
1. Convert to Binary
2. Convert to Octal
3. Convert to Hexadecimal
Enter your choice no. : 2
The Octal equivalent of 67 is 103
```

```
student@student-HP-ProDesk-600-G5-MT:~/2022ITB012/Assignment2$ ./a.out
Enter the decimal number : 1748
1. Convert to Binary
2. Convert to Octal
3. Convert to Hexadecimal
Enter your choice no. : 3
The Hexadecimal equivalent of 1748 is 6D4
```

3. WAP to assist in the design of a hydroelectric dam. Prompt the user for the dam's height and the number of cubic meters of water projected to flow from the top to the bottom each second. Predict how many megawatts of power will be produced if 90% of the work done on the water by gravity is converted to electrical energy.

For the following runs, report the outputs.
A. Use height = 200 m and flow of 1.50 x 10^3 m^3/s.
B. Use height = 170 m and flow of 1.30 x 10^3 m^3/s.

Code:

```c
// Calculates power produced by a dam
#include <stdio.h>
int main()
{
    float vol, h;
    printf("Enter the dam's height(in m) : ");
    scanf("%f", &h);
    printf("Enter the water flow(in m^3/s) : ");
    scanf("%f", &vol);
    printf("Power produced : %.4f MW\n", 0.9* vol* 9.81* h);
    return 0;
}
```

Outputs:

```
student@student-HP-ProDesk-600-G5-MT:~/2022ITB012/Assignment2$ gcc 12_a2_3.c
student@student-HP-ProDesk-600-G5-MT:~/2022ITB012/Assignment2$ ./a.out
Enter the dam's height(in m) : 200
Enter the water flow(in m^3/s) : 1500
Power produced : 2648700.0000 MW
```

```
student@student-HP-ProDesk-600-G5-MT:~/2022ITB012/Assignment2$ ./a.out
Enter the dam's height(in m) : 170
Enter the water flow(in m^3/s) : 1300
Power produced : 1951209.0000 MW
```