LAB 1

NAME: ARCHISHA BORAH

SAP ID: 590018066

DATA COMMUNICATION AND NETWORKS

CODE & OUTPUT:

converter.cpp > ...

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

int* stringToBinary(char str[], int *bitCount) {
    int len = strlen(str);
    *bitCount = len * 8;

    int *bits = (int*) malloc((*bitCount) * sizeof(int));
    if (bits == NULL) {
        printf("Memory allocation failed!\n");
        return NULL;
    }

    int k = 0;

    for (int i = 0; i < len; i++) {
        int ascii = str[i];
        for (int j = 7; j >= 0; j--) {
            bits[k + j] = ascii % 2;
            ascii = ascii / 2;
        }
        k += 8;
    }

    return bits;
}

int main() {
    char headerStr[50], dataStr[50];
    int hBitsCount, dBitsCount;

    printf("Enter Header string: ");
    scanf("%s", headerStr);

    printf("Enter Data string: ");
    scanf("%s", dataStr);
```

```c
    int *header = stringToBinary(headerStr, &hBitsCount);
    int *data   = stringToBinary(dataStr, &dBitsCount);

    if (header == NULL || data == NULL)
        return 1;
    int totalBits = hBitsCount + dBitsCount;
    int *packet = (int*) malloc(totalBits * sizeof(int));

    if (packet == NULL) {
        printf("Memory allocation failed!\n");
        free(header);
        free(data);
        return 1;
    }
    int k = 0;
    for (int i = 0; i < hBitsCount; i++)
        packet[k++] = header[i];

    for (int i = 0; i < dBitsCount; i++)
        packet[k++] = data[i];

    printf("Header (binary): ");
    for (int i = 0; i < hBitsCount; i++)
        printf("%d", header[i]);

    printf("\nData   (binary): ");
    for (int i = 0; i < dBitsCount; i++)
        printf("%d", data[i]);

    printf("\nPacket (binary): ");
    for (int i = 0; i < totalBits; i++)
        printf("%d", packet[i]);

    printf("\nTotal number of bits: %d\n", totalBits);
```

```c
    free(header);
    free(data);
    free(packet);

    return 0;
}
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS D:\CSE\DATA COMMUNICATION AND NETWORKS> cd "d:\CSE\DATA COMMUNICATION AND NETWORKS\" ; if ($?) { g++ Bitconverter.cpp -o Bitconverter } ; if ($?) { .\Bitconverter }
Enter Header string: 23FDG56
Enter Data string: 22XCV50
Header (binary): 001100100011001101000110010001000100011100110101001101 10
Data   (binary): 001100100011001001011000010000110101011000110101001100 00
Packet (binary): 00110010001100110100011001000100010001110011010100110 1001100011001000101100001000011010101100011010100110000
Total number of bits: 112
PS D:\CSE\DATA COMMUNICATION AND NETWORKS>
```