Assignment 1

M Sai Mehar - EE18BTECH11029

Download all Codes from

https://github.com/saimehar31/C_DS/assignment1/codes

Download all latex-tikz codes from

https://github.com/saimehar31/C_DS/assignment1/ee18btech11029.tex

1 Problem

(Q 4) In 16-bit 2's complement representation,the decimal number -28 is:

2 Solution

Explanation
The binary representation of +28 is

$$0000\,0000\,0001\,1100 \tag{2.0.1}$$

Function for finding the binary representation of number

```
void decToBinary(int n)
{
    int binary[16] = {0}, i = 0;
    while (n > 0) {
        binary[i++] = n % 2;
        n /= 2;
    }

    //Binary Representation of Number
    for (int j = 15; j >= 0; j--)
        cout << binary[j];
}
```

In order to find 2's complement of a number we need to find 1's complement and add 1 to it. 1's complement of a number is found by inverting each bit in decimal representation of number.
1's complement representation of +28 is given as

$$1111\,1111\,1110\,0011 \tag{2.0.2}$$

Function for finding 1's complement of number

```
void onecomplement(int binary[])
{
    // Finding one's complement of the number
    for (int k = 15; k >= 0; k--)
    {
        binary[k] = !binary[k];
    }
    //Binary representation of 1's complement
    for (int j = 15; j >= 0; j--)
        cout << binary[j];
}
```

2's complement representation is given as

$$1111\,1111\,1110\,0100 \tag{2.0.3}$$

```
void twocomplement(int binary[])
{
    // finding two complement of a number
    int carry = 1;
    for (int k = 0; k <= 15; k++)
    {
        if (binary[k] == 1 and carry == 1)
            binary[k] = 0;
        else if (binary[k] == 0 and carry == 1)
        {
            binary[k] = 1;
            carry = 0;
        }
    }
    //binary representation of 2's complement
    for (int j = 15; j >= 0; j--)
        cout << binary[j];
}
```

Hence in 2's complement representation, the decimal number -28 is given as

$$1111\,1111\,1110\,0100 \tag{2.0.4}$$