1. Number Conversion (Binary, Decimal, Hexadecimal)

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

void decimalToBinary(int n) {
    int binary[32];
    int i = 0;
    while (n > 0) {
        binary[i] = n % 2;
        n = n / 2;
        i++;
    }
    printf("Binary: ");
    for (int j = i - 1; j >= 0; j--)
        printf("%d", binary[j]);
    printf("\n");
}

int binaryToDecimal(char bin[]) {
    int len = strlen(bin);
    int base = 1, dec = 0;
    for (int i = len - 1; i >= 0; i--) {
        if (bin[i] == '1')
            dec += base;
        base *= 2;
    }
    return dec;
}

int main() {
    int choice, dec;
    char bin[32], hex[20];
    printf("==== Number Conversion Program ====\n");
    printf("1. Decimal to Binary\n");
    printf("2. Decimal to Hexadecimal\n");
    printf("3. Binary to Decimal\n");
    printf("4. Hexadecimal to Decimal\n");
    printf("Enter your choice: ");
    scanf("%d", &choice);
    switch (choice) {
        case 1:
            printf("Enter Decimal Number: ");
            scanf("%d", &dec);
            decimalToBinary(dec);
            break;
        case 2:
            printf("Enter Decimal Number: ");
            scanf("%d", &dec);
            printf("Hexadecimal: %X\n", dec);
            break;
        case 3:
            printf("Enter Binary Number: ");
            scanf("%s", bin);
            printf("Decimal: %d\n", binaryToDecimal(bin));
            break;
        case 4:
            printf("Enter Hexadecimal Number: ");
            scanf("%s", hex);
            printf("Decimal: %ld\n", strtol(hex, NULL, 16));
            break;
        default:
            printf("Invalid choice!\n");
    }
    return 0;
}
```

2. 1’s and 2’s Complement

```c
#include <stdio.h>
int main() {
    int num;
    printf("Enter an integer: ");
    scanf("%d", &num);
    int ones = ~num;
    int twos = ones + 1;
    printf("\nOriginal Number: %d", num);
    printf("\n1's Complement: %d", ones);
    printf("\n2's Complement: %d\n", twos);
    return 0;
}
```

3. Addition

```
MOV AL, 05H
MOV BL, 03H
ADD AL, BL
; Result: AL = 08H
```

4. Subtraction

```
MOV AL, 09H
MOV BL, 04H
SUB AL, BL
; Result: AL = 05H
```

5. Multiplication

```
MOV AL, 04H
MOV BL, 03H
MUL BL
; Result: AX = 000CH (12 in decimal)
```

6. Division

```
MOV AL, 0AH
MOV BL, 02H
DIV BL
; AL = Quotient, AH = Remainder
; Result: AL = 05H, AH = 00H
```

7. Logic Gates Implementation and Truth Table

A	B	AND	OR	NOT A	NAND	NOR	XOR	XNOR
0	0	0	0	1	1	1	0	1
0	1	0	1	1	1	0	1	0
1	0	0	1	0	1	0	1	0
1	1	1	1	0	0	0	0	1