Madan Bhandari Memorial College

Experiment 2: Data overflow

Objective:

1. To understand the concept of data overflow

Theory:

Overflow occurs when an arithmetic operation or a memory allocation exceeds the capacity of the data type or storage that is available. There are specific conditions under which overflow happens, depending on the type of operation and the data type being used.

Condition for overflow:

((AS==BS) &(AS==RS) || (AS! =BS))
{
NO overflow, display result;
}

Algorithm:

i. Start

ii. Observe carry into the sign bit position & carry out the sign bit position

iii. If the two carry aren't equal, overflow should be detected

iv. If the two carry are applied to an X-OR gate overflow will be detected when output of gate is 1.

v. Stop

Source Code:

```
#include <stdio.h>
int main()
{
   int num1, num2, result, sign1, sign2, signResult;
   printf("****Compiled by Jonash Chataut****\n");
   printf("Enter two 4-bit numbers (0 to 15): ");
   scanf("%d%d", &num1, &num2);
   result = num1 + num2;
   // Extract the 4th bit (sign bit) of each number and the result
```

```
    sign1 = (num1 >> 3) & 1;       // 4th bit of num1
    sign2 = (num2 >> 3) & 1;       // 4th bit of num2
    signResult = (result >> 4) & 1; // 5th bit of result (overflow bit)
    // Check for overflow
    if (signResult == 1)
    {
        printf("\nOverflow detected!\nThe result is: %d\n", result);
    }
    else
    {
        printf("\nNo overflow.\nResult = %d\n", result);
    }
    return 0;
}
```

Output: