

```
#####
#           cs315 Week 4 - part 2
#
#  -> Detecting overflow
#
#####
```

Do the following addition on the following two's complement 8 bit numbers and indicate if overflow occurs or not:

```

  1010 1010  --> -86
+  0101 0101  --> +85
-----
  1111 1111  --> -1
```

--> adding a negative number with a positive number, the signs are different, hence overflow cannot occur.

```

  0100 0001  --> +65
+  0100 0010  --> +66
-----
  1000 0011  --> -125 (overflow)
```

--> adding two positive numbers, the signs are the same and we can see that overflow occurred. Because result of adding two positive numbers yielded negative result.

```

  1000 0001  --> -127
+  1000 0010  --> -126
-----
  0000 0011  --> +3 (overflow)
```

--> adding two negative numbers, the signs are the same and we can see that overflow occurred. Because result of adding two negative numbers yielded positive result.

Note:

adding numbers with the same sign <-- overflow can occur (because magnitude gets larger)  
 adding numbers with different sign <-- overflow cannot occur (as magnitude gets smaller)