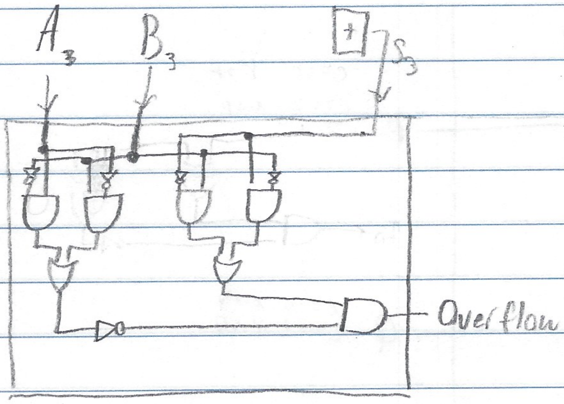
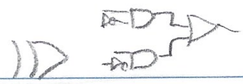
Carlo Quitorio

CSCI 113 Assignment 2

1)



1)



A	B	
0	0	0
0	1	1
1	0	1
1	1	0

$(\bar{A}\cdot B)+(A\cdot\bar{B})$

2) Logic #1

if (sign of op 1 == sign of op 2)
  if (sign of op != sign of sum)
    Overflow

```
 0 1        1 0
 0 _ _ _    1 _ _ _
+0 _ _ _   +1 _ _ _
 1 _ _ _    0 _ _ _
```

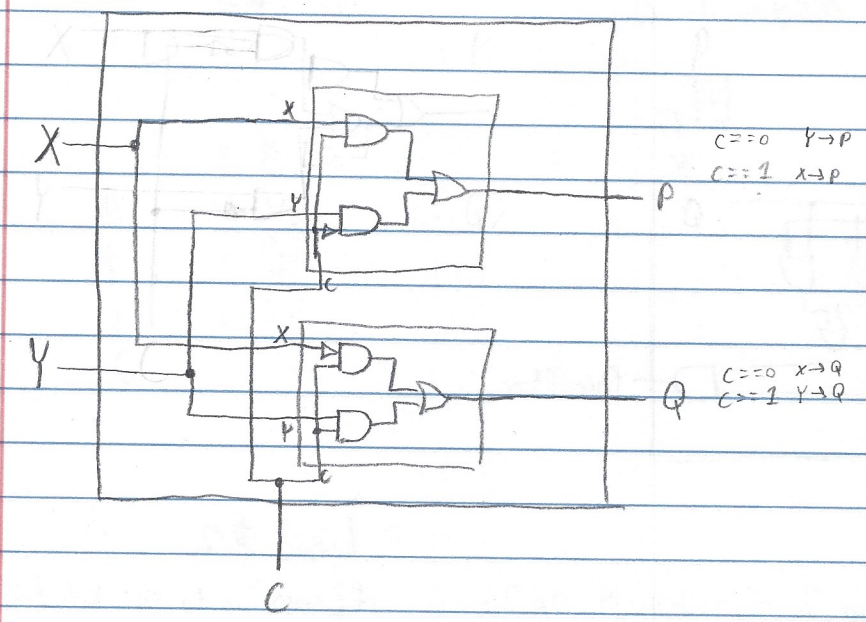
Logic #2

if (carry in to sign bit != carry out of sign bit)
  Overflow

```
 0 1        1 0
  0111       1011
+ 0101     + 1010
  1100       0101
```

When the sign bit of the operands are different from the sign bit of the result it overflows. When the carry in to the sign bit is different from the carry out from the sign bit, it overflows. When the carry in and carry out are different and it overflows, the sign of op != sign of the result. Also when sign of op != sign of result and it overflows, the carry in to sign bit != carry out from sign bit, shown by the above binary addition. Thus we can conclude that logic #1 is equivalent to logic #2.

3)



4) Amdahl's Law

$$S_p = \frac{1}{(1-F_e) + \frac{F_e}{S_e}}$$

2 times faster

$$2 = \frac{1}{(1-0.3) + \frac{(0.3)}{S_e}}$$

$$\boxed{S_e = -1.5}$$

S_p: Speed up of enhanced system (2)

Fe: fraction of enhanced mode (0.3)

Se: Speed up of enhanced mode (?)

It is not possible to get to 2 times the speed with 30% enhanced mode