

ECE 474A/574A Exam2 Cheat Sheet

Boolean Algebra			
Commutative $a + b = b + a$ $a * b = b * a$	Distributive $a * (b + c) = a*b + a*c$ $a + (b * c) = (a + b) * (a + c)$	Associative $(a + b) + c = a + (b + c)$ $(a * b) * c = a * (b * c)$	Identity $0 + a = a + 0 = a$ $1 * a = a * 1 = a$
Complement $a + a' = 1$ $a * a' = 0$	Null Elements $a + 1 = 1$ $a * 0 = 0$	Idempotent Law $a + a = a$ $a * a = a$	Involution $(a')' = a$

** you should know DeMorgan's Law

Convert SOP function to Complete Sum Methodology

1. Start with arbitrary SOP form
2. Add consensus pair of all terms not contained in any other term
3. Compare new terms with existing and among other new terms to see if any new consensus terms can be generated
4. Remove all terms contained in some other term

Repeat until no change occurs

$$CS(f) = ABS([x_1 + CS(f(0, x_2, \dots, x_n))] \cdot [x_1' + CS(f(1, x_2, \dots, x_n))])$$

```
BCP( F, U, currentSol ){
  ( F, currentSol ) = REDUCE( F, currentSol )

  if( terminalCase( F ) ){
    if( cost( currentSoln ) < U ){
      U = cost( currentSoln )
      return ( currentSoln )
    }
  }
}
```

```
L = LOWER_BOUND( F, currentSoln )
if ( L ≥ U ) return ( "no solution" )
```

```
xi = CHOOSE_VAR( F )
S1 = BCP( Fxi, U, currentSol u {xi} )
```

```
if( cost( S1 ) = L ) return ( S1 )
S0 = BCP( Fxi, U, currentSoln )
```

```
return BEST_SOLUTION( S1, S0 )
}
```

```
MIS_QUICK(M){
  MIS = Φ
  do {
    i = CHOOSE_SHORTEST_ROW(M)
    MIS = MIS u {i}
    M = DELETE_INTERSECTING_ROWS(M, i)
  } while ( || M || > 0 )
  return MIS
}
```

```
Simulated_Annealing{
  S = initial solution
  T = initial temperature (>0)

  while( T > 0 ){
    S' = pick a random neighbor to S
    C = cost of S - cost of S'
    if( C > 0 ){
      S = S'
    }
    else{
      r = random number in range [0...1]
      m = 1/e(C/T)
      if( r < m ){
        S = S'
      }
    }
  }

  T = reduced T;
}
```