In-class Exercise 11

(PAR 15)

- Solve for ITE (abcd, 1, c'd + a'd') using the variable ordering a ≤ b ≤ c ≤ d

```
ITE(F, G, H){
    (result, terminal_case) = TERMINAL_CASE(F, G, H)

    if (terminal_case) return (result)
    (result, in_computed_table) = COMPUTED_TABLE_HAS_ENTRY(F, G, H)

    if (in_computed_table) return (result)

    v = TOP_VARIABLE(F, G, H)
    T = ITE(Fv, Gv, Hv)
    E = ITE(Fv', Gv', Hv')
    R = FIND_OR_ADD_UNIQUE_TABLE(v, T, E)
    INSERT_COMPUTED_TABLE((F, G, H), R)
    return (R)
}
```

Table	Name	Expression	Equivalent Form
0000	0	0	0
0001	AND(F, G)	FG	ITE(F, G, 0)
0010	F > G	FG'	ITE(F, G', 0)
0011	F	F	F
0100	F < G	F'G	ITE(F, 0, G)
0101	G	G	G
0110	XOR(F, G)	F ⊕ G	ITE(F, G', G)
0111	OR(F, G)	F + G	ITE(F, 1, G)
1000	NOR(F, G)	(F + G)'	ITE(F, 0, G')
1001	XNOR(F, G)	(F ⊕ G)'	ITE(F, G, G')
1010	NOT(G)	G'	ITE(G, 0, 1)
1011	F ≥ G	F + G'	ITE(F, 1, G')
1100	NOT(F)	F'	ITE(F, 0, 1)
1101	F ≤ G	F' + G	ITE(F, G, 1)
1110	NAND(F, G)	(FG)'	ITE(F, G', 1)
1111	1	1	1

ITE(F, G, H) = FG + F'H

= ITE(v ITE(F_v, G_v, H_v), ITE($F_{v'}$, $G_{v'}$, $H_{v'}$))

Terminal Cases

ITE(1, F, G) = F ITE(F, 1, 0) = F

ITE(0, G, F) = F ITE(G, F, F) = F