Comp Theory – important Theorems:

**Chapter 7:**

**Theorem 7.14 (pg. 288):**

PATH is in P.

**Theorem 7.15 (pg 289):**

RELPRIME is in P.

**Theorem 7.16 (pg.290):**

Every CFL is a member of P.

**Theorem 7.20 (pg. 294):**

A language is in NP iff it is decided by some nondeterministic polynomial time Turing machine.

**Theorem 7.27 (pg. 300):**

SAT is in P iff P = NP.

**Theorem 7.31 (pg. 301):**

If A is polynomial time reducible to B and B is in P, then A is in P.

**Theorem 7.32 (pg. 302):**

3SAT is polynomial time reducible to CLIQUE.

**Theorem 7.35 (pg. 304):**

If B is NP-complete and B is in P, then P = NP.

**Theorem 7.36 (pg. 304):**

If B is NP-complete and B is polynomial time reducible to C, with C in NP, then C is NP-complete.

**Theorem 7.37 (pg. 304) (implies 7.27):**

SAT is NP-complete.

**Corollary 7.42 (pg. 310):**

3SAT is NP-complete.

(SAT is reducible to 3SAT in polynomial time)

**Theorem 7.44 (pg. 312):**

VERTEX-COVER is NP-complete

**Theorem 7.46 (pg. 314):**

HAMPATH is NP-complete.

**Theorem 7.55 (pg. 319):**

UHAMPATH is NP-complete

**Theorem 7.56 (pg. 320):**

SUBSET-SUM is NP-complete

**Chapter 8:**

**Theorem 8.5 (pg. 334, Savitch’s theorem):**

For any function f: N -> R+ where f(n) >= n,

NSPACE(f(n)) ⊆ SPACE(f2(n))

(non-deterministic space is a subset of space square)

**Theorem 8.9 (pg. 339):**

TQBF is PSPACE complete

**Theorem 8.11 (pg. 343):**

FORMULA-GAME is PSPACE-complete

**Theorem 8.14 (pg. 345):**

GG (Geography Game where player 1 has a winning strategy on graph G starting on node b)

GG is PSPACE-complete.

**Theorem 8.23 (pg. 352):**

If A is log space reducible to B, and B ∈ L, then A ∈ L.

**Corollary 8.24 (pg. 353):**

If any NL-complete language is in L, then L = NL.

**Theorem 8.25 (pg. 353):**

PATH is NL-complete

Corollary 8.26 (pg. 354):

NL ⊆ P