# CS313H
# Logic, Sets, and Functions: Honors
# Fall 2012

**Prof: Peter Stone**
**TA: Jacob Schrum**
**Proctor: Sudheesh Katkam**

Department of Computer Science
The University of Texas at Austin

# Good Morning, Colleagues

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Are there any questions?

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  - And ask in class!

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- Go to discussion section
- Quizzes may happen in class or discussion section

# Some important concepts

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- CNF and DNF
  - Why do we care in practice?

# Simplify

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- $\neg(F \vee \neg(T \wedge \neg(\neg T \vee \neg(F \wedge T))))$

# Simplify

- $(\neg T \vee F) \wedge (\neg F \vee T) \wedge \neg(F \vee F)$

- $\neg(F \vee \neg(T \wedge \neg(\neg T \vee \neg(F \wedge T))))$
  $\equiv \neg(F \vee \neg(T \wedge \neg(\neg T \vee \neg F)))$
  $\equiv \neg(F \vee \neg(T \wedge \neg(F \vee T)))$
  $\equiv \neg(F \vee \neg(T \wedge \neg T))$
  $\equiv \neg(F \vee \neg(T \wedge F))$
  $\equiv \neg(F \vee \neg F)$
  $\equiv \neg(F \vee T)$
  $\equiv \neg T$
  $\equiv F$

# Satisfiable?

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- $(P \vee Q) \wedge (P \vee \neg Q) \wedge (\neg P \vee Q) \wedge (\neg P \vee \neg Q)$
- $\neg(A \vee C \vee \neg(B \wedge \neg A \wedge \neg(\neg B \vee A \vee C)))$

# CNF, DNF, or neither?

- $(A \wedge \neg B) \vee (B \wedge \neg C)$

# CNF, DNF, or neither?

- $(A \wedge \neg B) \vee (B \wedge \neg C)$
- $(A \wedge B) \vee (\neg B \wedge C) \vee \neg(A \wedge C)$

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  $\equiv (F \vee Q) \wedge \neg(P \vee Q)$ (negation)

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  $\equiv Q \wedge \neg P \wedge \neg Q$ (De Morgan)

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  $\equiv Q \wedge \neg Q \wedge \neg P$ (commut.)

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  $\equiv F \wedge \neg P$ (negation)
  $\equiv F$ ($\wedge$ domination)

# Assignments for Thursday

- Module 3 with associated readings

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- Start on first HW assignment (requires module 3 to complete)