# cs5050

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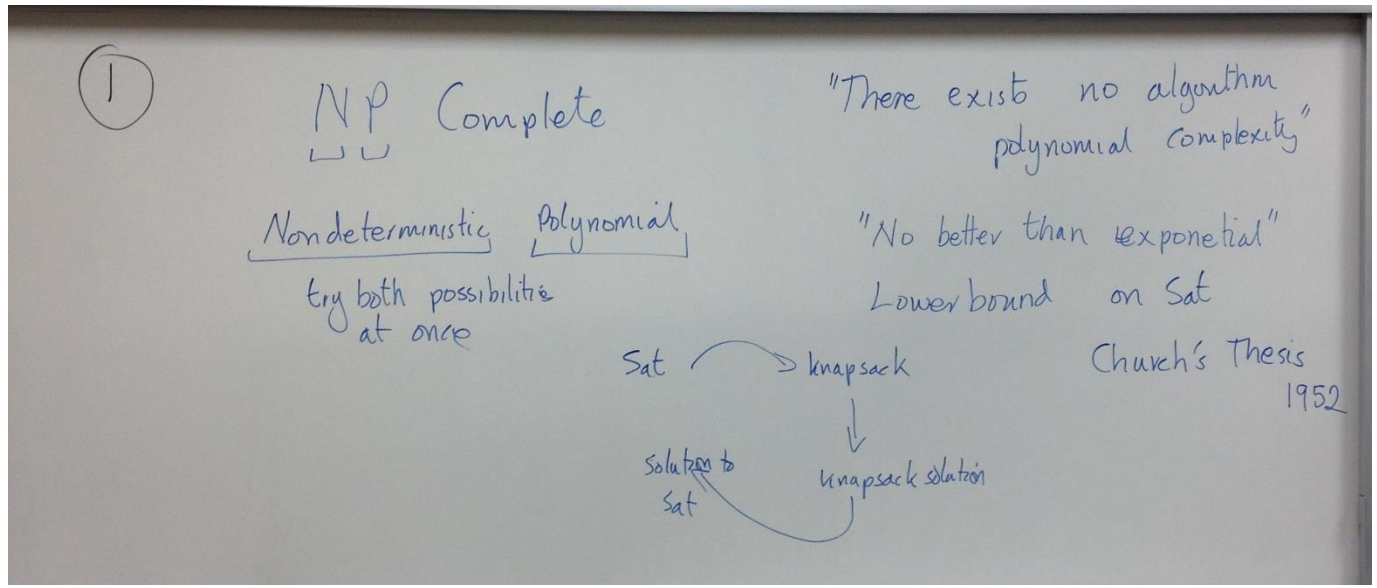
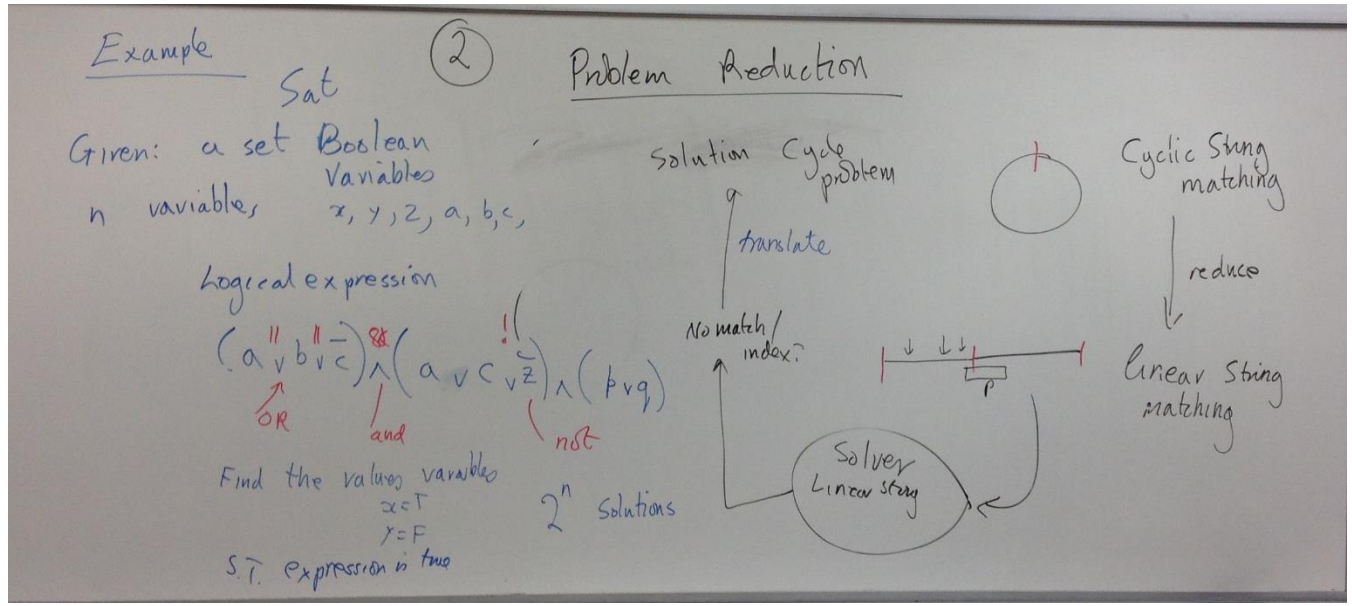
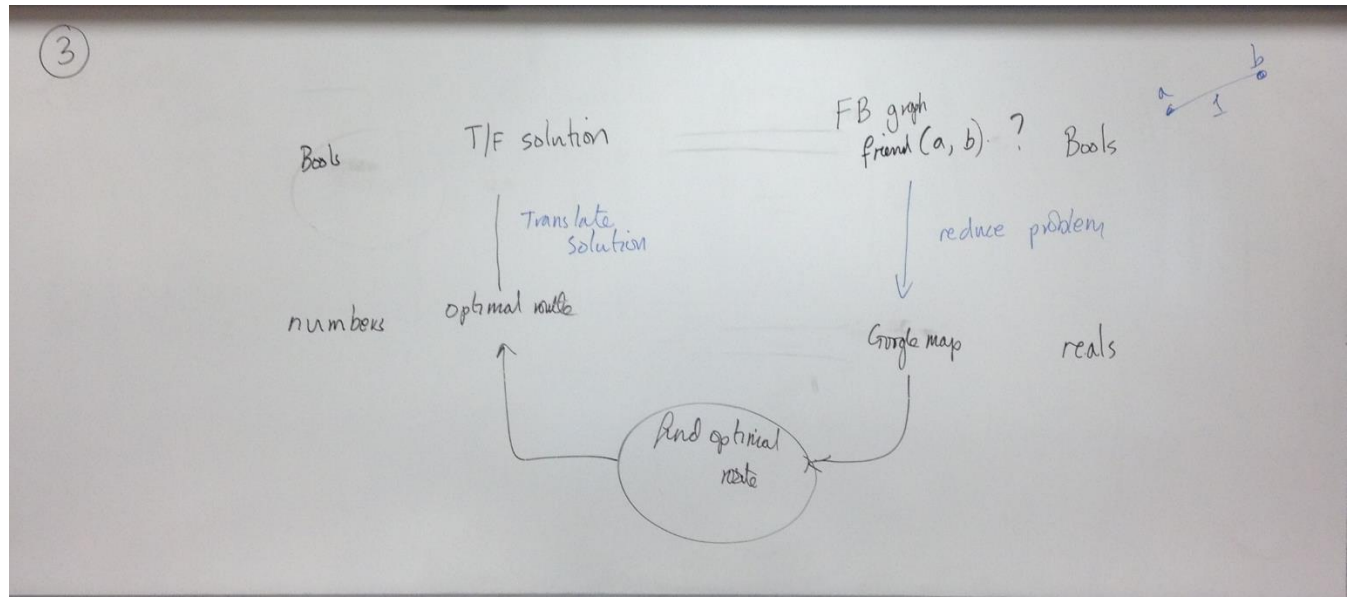
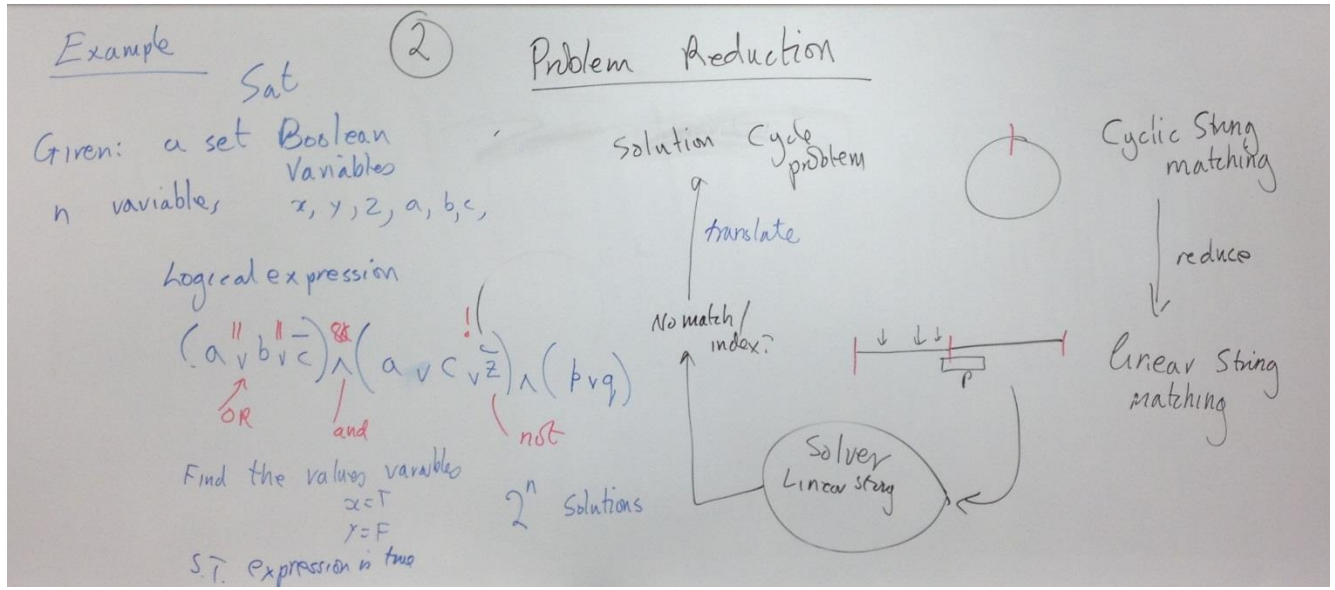

1
NP Complete
Nondeterministic
Polynomial
try both possibilities at once
"There exist no algorithm polynomial complexity"
"No better than exponential"
Lower bound on Sat
Church's Thesis 1952
Sat
knapsack
solution to Sat
knapsack solution


Example
Sat
(2)
Problem Reduction
Given: a set Boolean Variables
n variables, x, y, z, a, b, c,
Logical expression
OR
and
not
Find the values variables
x=T
y=F
S.T. expression is true
2^n Solutions
Solution Cycle problem
translate
No match/ index?
Solver Linear string
Cyclic String matching
reduce
Linear String matching


3
Bools
T/F solution
FB graph
friend(a, b) ?
Bools
a
b
1
Translate solution
reduce problem
numbers
optimal route
Google map
reals
find optimal route


Example
Sat
2
Problem Reduction
Given: a set Boolean Variables
n variables, x, y, z, a, b, c,
Logical expression
OR
and
not
Find the values variables
x=T
y=F
S.T. expression is true
2^n Solutions
Solution Cycle problem
translate
No match / index?
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## 3 color problem

(4) Given : a graph
nodes
edges (non-directed)

: 3 colors

Find: assignment of colors to nodes s.t. no connected nodes have the same color

T, F, A