

## CS292A Notes

## \* 3-SAT.

Input: set of 3-clauses, literals from choice of  $n$  booleans.

Output: an assignment that satisfies or maximizes number of clauses satisfied.. where a clause is satisfied

if an assignment assigns  $T = x_i, F = \bar{x}_i \quad \forall x_i \in \text{clause } C$ .

## Algorithm:

- iterate through  $n$  variables

- Set  $x_i = \text{True}$  if more clauses use  $x_i$  than  $\bar{x}_i$ , false otherwise

- Output assignment of  $x_1, \dots, x_n$

## \* Quicksort.

- Input:  $A[1], \dots, A[n]$  list of values.

- Output: sorted list of values.

- Algorithm:

- if  $|A| \leq 1$ , return  $A$

- pick pivot  $p \in A$  u.a.r.

- $L = \{A[i] : A[i] < p\}$

- $R = \{A[i] : A[i] > p\}$

- return  $[QS(L), p, QS(R)]$

## \* Quickselect.

- Input:  $A[1], \dots, A[n], k$

- Output:  $k$ th value in the sorted list

- Algorithm:

- if  $|A| = 1$ , return  $A[1]$

- pick pivot  $p \in A$  u.a.r.

- $L = \{A[i] : A[i] < p\}$

- $R = \{A[i] : A[i] > p\}$

- if  $|L| \geq k$  return  $QS(L, k)$

- if  $|L| = k-1$  return  $p$

- else return  $QS(R, k-|L|-1)$