

CS 6901 Capstone Exam Systems Winter 2017: Choose any 2 of the 3 problems.

1) Design a fully simplified combinational circuit as follows:

3 inputs:  $a_2, a_1, a_0$  treated as a 3-bit signed integer

3 outputs:  $b_2, b_1, b_0$  to be the 2's complement of

Show your work and draw the resulting circuit diagram.

2) There are 3 standard goals to the process mutual exclusion problem.

Goal 1 Mutual exclusion is guaranteed

Goal 2 Deadlock cannot occur.

Goal 3 Indefinite postponement cannot occur.

Attempted Solution: common variables: flag1, flag2 (both initially false)

```
Process 1
while (true) {
  flag1 = true;
```

goal.

```
Process 2
while (true) {
  flag2 = true;          an execution sequence that violates the
```

CS 6901 Capstone Exam Data Structures Algorithms Winter2017

Choose any 2 of the 3 problems.

1) Given a (possibly empty) binary search tree of integers, write a function that constructs a singly linked list of the tree's entries in ascending order. Return a pointer to the first entry in the list.

2)

## Theory Exam

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Answer **ANY TWO** of the following three questions:

1.