CS402/615 Take-home Quiz 2

Max marks: 30   **Time: 1 week**

- *Be brief, complete and stick to what has been asked.*

- *Unless asked for explicitly, you may cite results/proofs covered in class without reproducing them.*

- ***If you need to make any assumptions, state them clearly.***

- ***Do not copy solutions from others. Penalty for offenders: FR grade.***

1. Consider the functions `foo` and `bar` given below, in which all variables are of type `int`.

```
void foo(int i, int j, int k)          int bar(int n)
{                                      {
L1:   if (i > 5) then {                L15: if (n > 4) then {
L2:      j = bar(i);                   L16:    return (n-1);
L3:   }                                L17: }
L4:   else {                           L18: else {
L5:      if (j > 5) then {             L19:    return (n+1);
L6:         j = bar(j);                L20: }
L7:      }                             }
L8:      else {
L9:         j := 5;
L10         while (j + k > 5) do {
L11:           j = bar(j+k);
L12:        }
L13:     }
L14:  }
}
```

Construct a Boolean program for functions `foo` and `bar` using the following Boolean variables for predicates. Recall from our discussion in class that we are allowed to have an additional global variable, `retval`, to allow values to be returned from called functions (i.e., from function `bar` in this problem). Your Boolean program should try to mimic the behaviour of the functions as precisely as possible, as far as the values of the predicates given below are concerned.

Predicate	Boolean variable
$i > 5$	b_1
$j > 5$	b_2
$j + k > 5$	b_3
$retval > n$	b_4
$retval > 5$	b_5
$n > 5$	b_6