CS615 Autumn 2004 Quiz 1

Time: 60 mins Total marks:

- ***The exam is open book and notes.***
- ***Results/proofs covered in class/problem sessions/assignments may simply be cited, unless specifically asked for.***
- ***Unnecessarily lengthy solutions will be penalized.***
- ***If you need to make any assumptions, state them clearly.***
- ***Do not copy solutions from others or indulge in unfair means.***

1. Consider the following program:

```
L1 := false;
L2 := false;

while (n1 + n2 > 0)
  if (L2 = false)
    if (n1 > 0)
        L1 := true;
        n1 := n1 - 1;
    else
        L1 := false;

  L2 := not L2;
  L1 := not L1;

  if (L1 = false)
    if (n2 > 0)
        L2 := true;
        n2 := n2 - 1;
    else
        L2 := false;
```

Give a precondition for this program such that the loop invariant for the while loop implies `L2 = false` OR `L1 = false`.

You must show the loop invariant and show how your precondition gives rise to this loop invariant, using the stepwise induction Floyd Naur proof method, discussed in class.