Quiz-1 CS618

Duration: 45 Minutes   Max Marks: 45

- Write your name and roll number on the question paper and the answer book.

- No explanations will be provided. In case of a doubt, make suitable assumptions and justify.

```
/* ------ entry ------- */

    x = ... /*something*/
    y = x + 3

L2:
    if (y > 20) goto L1
    x = x + 2
    y = x + 3
    goto L2

L1:
    v = x + 3
    w = x + 2

L3:
    u = v + w
    goto L5

L4:
    w = v + w
    goto L7

L5:
    z = w
    u = x * y
    if (u < z) goto L4
    goto L6

L6:
    goto L7

L7:

/* ----- exit --------- */
```

1. (10) Convert the given 3-address program to a CFG. Note that:

   (a) The basic blocks should be maximal basic blocks.

   (b) Clearly show the statements inside each basic block.

   (c) For edges corresponding to the conditional gotos, label the true edge as **T** and false edge as **F**.

2. (15) Perform **Very Busy Expression** analysis for the given program. In particular,

   (a) Compute **gen** and **kill** for each basic block.

   (b) Give initial values of **IN** and **OUT** for each basic block.

   (c) Give final **IN** and **OUT** for each basic block. You do not need to show the intermediate passes.

3. (20) An expression **e** is **Partially Available** at a program point π if there is *some* path from *entry* to π that contains a computation of **e** which is not followed by an assignment to any of its operand.

   Perform **Partially Available Expression** analysis for the given program. In particular,

   (a) Compute **gen** and **kill** for each basic block.

   (b) Give **equations** for computing **IN** and **OUT** for a basic block.

   (c) Give initial values of **IN** and **OUT** for each basic block.

   (d) Give final **IN** and **OUT** for each basic block. You do not need to show the intermediate passes.