

CS6235 Quz 1 Exam: Feb 23 2022

Maximum marks = 22, Time: 1.00 hr

Name: _____ Roll: _____

- Write your roll number on every sheet of the answer book.
- Every question is for five marks. Marks will be given based on the answer(s) and the working shown in the paper. If the working is not shown, no marks will be awarded.
- **Negative marking.** Each incorrect True/False answer will lead to a deduction of 0.5 mark.
- Advise: work out each question succinctly and legibly.
- Start the answer for each question on a new page.
- Total marks=25.

1. Consider the following snippet of (partly) Java style code.

```
class A{
    public static void main(String []a){
        L5: S0;
        L6: Thread t1 = new X();
        L7: t1.start();
        L8: t1.join();
    }
}

class X extends Thread {
    public void run(){
        L1: S1;
        synchronized (this) {
            L2: S2;
            L3: new X().start();
            L4: S4;
        }
    }
}
```

Identify the statements that run in parallel with each other. Also identify the HB relationship between the statements.

Use the labels to identify the statements in the relations.

2. Consider the following snippet of code:

```
class A {int f;}
class Main {
    public static void main(String [] args)
    {
        Reader r1 = new Reader();
        r1.start();
        r1.join(); } }

class Writer extends Thread {
    A buffer;
    public Writer(A b){ buffer = b; }
    public void run() {
        synchronized(buffer)
        {
            buffer.notify();
            buffer.f=100;
        } } }

class Reader extends Thread {
    public void run() {
        Writer w1;
        A[] buffer = new A[1];
        buffer[0] = new A();
        w1 = new Writer(buffer[0]);
        w1.start();
        synchronized (buffer)
        {
            buffer.wait();
            System.out.println(buffer[0].f);
        }
        w1.join();
    }
}
```

Find if the code has (i) data-races, (ii) deadlock. Give details if the answer is affirmative to any of them.

3. **Unreachable code elimination.**

Given a procedure, and the set of basic-block leaders, write an algorithm that can be used to delete unreachable code.

4. **Constant Propagation.**

Modify the constant algorithm studied in the class to derive a flow insensitive version of the same.

Section 2. True/False (1 mark each)

_____ Amdahl's law is not applicable to serial programs.

_____ The most conservative set of reaching definitions is that every definition reaches every program point.

_____ Given a program P of size N , the maximum size of the points-to lattice is N^2 .

_____ In a C program with no global variables, two threads invoking a common method with a static variable therein, cannot lead to data-race.

_____ Excluding the special entry/exit blocks, the maximum number of basic-blocks in a C program with 100 statements (each ending with a semi-colon) = 100.