CSE 3341 Midterm 2 Review

1 Sample Problems

Here are some sample problems to give you an idea of what I might ask on the midterm:

1. Consider the following C program:

```
void fib(int n, int *result) {
    int temp;
    if (n < 2) {
        *result = n;
    } else {
        fib(n-1, result);
        fib(n-2, &temp);
        *result += temp;
    }
}
```

```
void main() {
    int result;
    fib(3, &result);
    printf("%d\n", result);
}
```

   Draw the call stack for the moment when main has called fib(3, . . .), which has called fib(1, . . .), which is just about to return. Fill in the values on the stack: for pointers, draw the pointer, for non-pointers, write the values. For both pointers and non-pointers, if the value is unknown leave a blank entry.

2. Consider the following code in a new language we are creating:

```
int f(x, y) {
    x = y + x
    return x
}

main() {
    int x = 1
    int y = 1
    int z = f(x,y) // This is line A
    print(x + y + z)
}
```

   If we decide our language will pass parameters using "call-by-value", does the call to f(x, y) in line A exhibit referential transparency? What if we decide to use "call-by-reference"?

3. Consider the following code, written in a language that supports dynamic dispatch:

```
class Student {
    public void Print() {
        System.out.println(”Student”);
    }
}

class CSE extends Student {
    public void Print() {
        System.out.println(”CSE”);
    }
}

class Main{
    public static void PersonPrint( Student o ) {
        o.Print();
    }
    public static void main(String[] args) {
        Student x = new Student();
        Student y = new CSE();
        CSE z = new CSE();
        PersonPrint(x);
        PersonPrint(y);
        PersonPrint(z);
    }
}
```

Identify the static and dynamic targets for the invocation o.Print() in PersonPrint. What is printed when we run the program?

4. (pts) Suppose in my C program I have the following code:

```
int *ptr, *qtr;
int a = 1, b = 2, count;
ptr = &a;
qtr = &b;
count = *ptr + *qtr;
```

What can you say about the value of count?