Name: ____

CS 120B, Section 002
Quiz #1

1. (10 pts) Write a single RIMS-compatible C-language statement that inverts the values of A7…A4 and copies them to B3…B0 and copies the values of A3…A0 to B7… B4.

   B = ((~A) >> 4) | (A << 4)

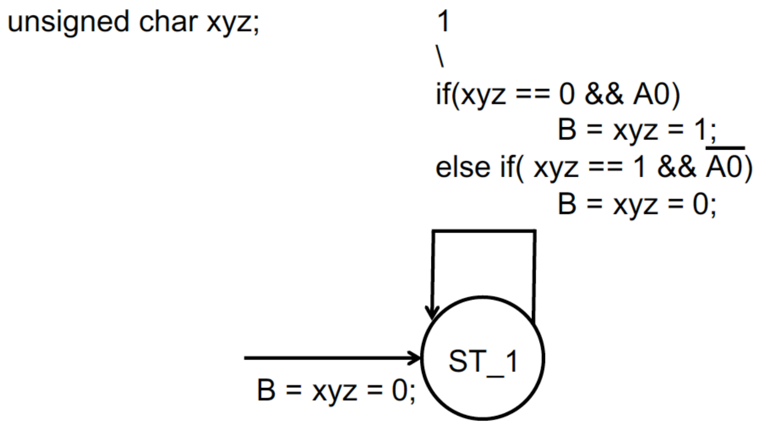
   Masking is not needed for this particular problem instance; however, the following solution, with masking, remains correct:

   B = (((~A) & 0xF0) >> 4) | ((A & 0x0F) << 4);

   An optimizing compiler would recognize that the masking is not needed and could eliminate the two bitwise-& operations.

   Either answer is fully correct.

2. (25 pts) Convert the following SM to RIMS-Compatible C using the template described in the PESzyBook and discussed in class. Use the back of the sheet, if necessary.



Name: ____

```
#include “RIMS.h”
unsigned char xyz;
enum States {Start, ST_1} state;

void Tick()
{
        switch(state) {
                case Start:
                        B = xyz = 0;
                        state = ST_1;
                        break;
                case ST_1:
                        if( xyz == 0 && A0 )
                                B = xyz = 1;
                        else if(  xyz == 1 && !A0 )
                                B = xyz = 0;

                        // Assignment to “state” is optional since the SM always stays in state ST_1
                        // It is included here for completeness
                        state = ST_1;
                default:
                        break;
        } // Transitions

        // This switch statement is optional since there are no state actions.
        // It is included here for completeness.
        switch(state) {
                case Start:
                        break;
                case ST_1:
                        break;
                default:
                        break;
        } // State Actions
}

void main() {
        B = 0;
        state = Start;
        while(1) { Tick(); }
}
```