CS220: Lab#7B Test Program

Please demonstrate that the following test program runs correctly on your hardware. Notice that the designed hardware is a miniature processor with a register file and eight instructions. It has a 16-bit comparator, an array of 16 XOR gates, and a right shifter. In the following, I list the C statements of the program along with translation into assembly language of this miniature processor. I use the binary command encoding as the instruction names. The registers are numbered $0 to $31. All numbers in the following are listed in decimal. Use 16-bit two's complement representation for binary conversion.

```
   C statements                  Assembly language instructions
-------------------------------------------------------------------
short a, b, c, d;
a = 17;                           000  $1  17
printf("%h", a); b = -9;          011  $1  $2  -9
printf("%h %h", a, b); c = 65;    100  $1  $2  $3  65
printf("%h %h", b, c);            010  $2  $3
d = (a < c) ^ (c < b);            101  $1  $3  $4     // a < c
                                  101  $3  $2  $5     // c < b
                                  110  $4  $5  $6     // d
d = d ^ (b >> 2) ^ (c >> 4);      111  $2  $4   2     // b >> 2
                                  111  $3  $5   4     // c >> 4
                                  110  $6  $4  $6     // d ^ (b >> 2)
                                  110  $6  $5  $6     // d
printf("%h", d);                  001  $6
```

Enter the instructions one by one and show the TA the corresponding output.