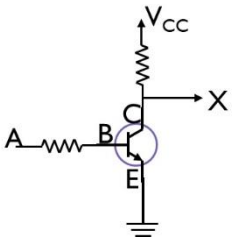
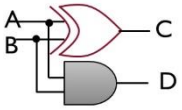
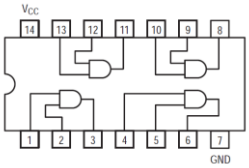
1. There are two important concepts for computer programming. One is calculation and the other is coding. Where did the coding concept come from? (It came from the invention of a special machine. Please describe it.) (10%)
2. The relay can be used to turn on/off the current. Which generation of computer was it used? What key techniques were used for the second and the third generations of computer? (10%)
3. The right figure shows the electronic circuit of the logic gate, the 'not' gate. Please describe how the not gate is operated. For example, please illustrate the input signal of 0 and 1, represented as 0 and 5 V, respectively on one port (one end of the wire) and describe the output signal. Remember to explain how the transistor work for the 'not' gate operation. (20%)

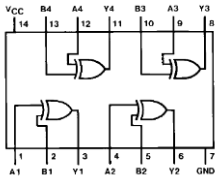


4. Please write the truth table of the right combinational logic gates. Please explain that which output pin (C or D) can be used as a summation result of a one-bit adder and which pin can be a carry out pin. (10%)



5. Please use a 9 V battery, LM7805, 74LS86, and 74LS08 to demonstrate 1+0=1, 1+1=0 with carry out. (20%)

74LS08: 

, 74LS86: 

, battery: 

LM7805: 

6. What is the first generation of the programming language? (10%)
7. Please use 8-bit unsigned integer to show how computer calculate the decimal number operation of 12 x 12 = 144. (Remember to use the shift operation.) (10%)
8. Please use 8-bit signed binary numbers to show how computer calculate the decimal number operation of 63 – 128. Remember to find the binary number of -128 and perform the addition operation. After the addition operation, please translate the binary form back to the signed decimal number. (10%)

Please use a dos bat file to code.

1. In the beginning of the bat file, please print out your name and your student ID number.

2. Please print out “Part I” before you start the coding of this section. Please ask the user’s input of two decimal numbers. You can ask to get them one by one. Please show the two numbers in (a) a binary form and (b) an octal form. Please calculate the “and” operation of the two numbers and show the result in (c) a binary form and (d) an octal form. (40%)
3. Please print out “Part II”. Please ask the user’s input of two binary numbers. You can ask twice to get the two binary numbers. Please calculate the “xor” and “or” operations of the two binary numbers and print the results out. (40%)
4. Please print out “Part III”. Please calculate the summation of the series: $1+1/7+(1/7)^2+(1/7)^3+(1/7)^4+\ldots$ Please show the result with 5 digits, like 1.1665. You shall multiply the number 1 by 10000 for calculation. After you get the summation number, you shall divide the result with 10000 and get the remaining number. You shall obtain the first digit 1 and the remaining digit 1666. Please use string operation to combine them together to print out 1.1666. (20%)