

FALL 2007  
CS 113: Introduction to Computers  
***Assignment 1***  
*Due: September 13, 2007*  
**Number Systems, Data Representation, and Flowcharts**  
(16 points)

Start Microsoft Word and type a page in the following format:

CS 113 Introduction to Computers  
Instructor: Dmitri Gusev  
***Assignment #***  
Due: Due date  
Your Name

Save the resulting one-page document in a file under the name “CS113\_Header.doc” for future use. If you’re doing this exercise using a public computer, don’t forget to save the file on your personal portable drive or floppy disk. Save the header document one more time, under the name “CS113\_Assignment1.doc”. Edit the document to say “***Assignment 1***” and type in “September 13” as the due date. Make sure that your actual name is on the page, and not the “Your Name” placeholder shown above. ☺ Type your solutions to the following exercises.

**Exercise 1 (1 point).** Convert  $576_8$  from octal to binary.

**Exercise 2 (1 point).** Convert  $1010100_2$  from Base 2 to Base 8.

**Exercise 3 (1 point).** Convert  $1DC_{16}$  from Base 16 to Base 2.

**Exercise 4 (1 point).** Convert  $100101010_2$  from binary to hexadecimal.

**Exercise 5 (1 point).** Convert  $1670_{10}$  from Base 10 to hexadecimal.

**Exercise 6 (1 point).** Having 8 bits available for the magnitude and one extra bit at the beginning for the sign, convert  $-131_{10}$  to the signed-magnitude binary representation such that the positive sign is represented by a ‘0’ and the negative sign is represented by a ‘1’ preceding the rest of the representation.

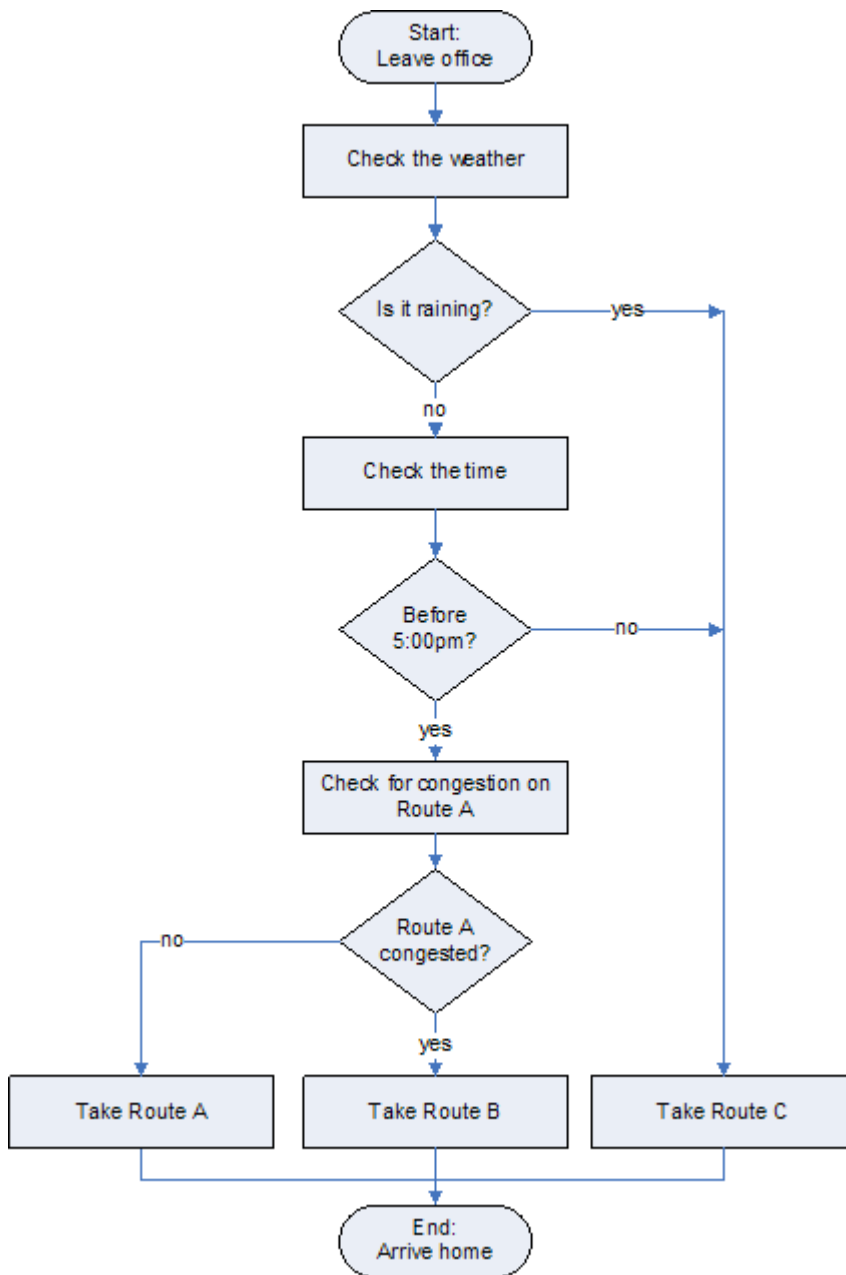
**Exercise 7 (1 point).** Compute  $\text{Negative}(421_{10})$  in the Ten’s Complement representation such that  $k=4$  is the number of decimal digits used.

**Exercise 8 (1 point).** Compute  $\text{Negative}(1101010_2)$  in the Two's Complement representation such that  $k=8$  is the number of bits used.

**Exercise 9 (1 point).** Write 6,965,900 in the scientific notation using an "E", as described on p. 66 of the textbook.

**Exercise 10 (1 point).** Convert  $25.125_{10}$  from decimal to binary.

**Exercise 11 (6 points).** Study the flowchart below.



Type a plain English explanation of the algorithm shown in this flowchart. Describe all steps required to achieve the goal of the algorithm.