Problem 1. (10 pts) Suppose you have a vector of $N$ values, $A = (A_1, A_2 \ldots A_N)$. You want to write a program that looks at all of the values in order (that is, it looks at all of the $A_i$, starting with $i = 1$), and outputs “Yes” anytime the next value in the vector is bigger than the one you’re looking at. The following flowchart is intended to represent the program. However, the program described by the flowchart has two problems (hint: one problem is for the case $N = 1$). Explain the problems, then draw a new flowchart (to perform the same task) that fixes the problems. Make sure your flowchart follows the rules we laid out in class (ask if you need clarification!).

Problem 2. (Total 30 pts) Suppose that you’re a programmer for a vending machine manufacturer. A certain model of vending machine sells sodas for one dollar and only accepts coins. A consumer has $N$ coins in her pocket. The value of these coins is given by the vector $C = [C_1 \ C_2 \ldots C_N]$, where $C_i$ is the value, in cents, of coin $i$. The consumer feeds the coins into the vending machine in order, starting with $i = 1$. You would like a Matlab program that gives the output

The first <number> coins are sufficient. Your change is <amount> cents.

where <number> is the minimum number of coins, counting from coin 1, that adds up to at least a dollar; or gives the output

Sorry, insufficient funds.

in the event the consumer has, well, insufficient funds. Use the fprintf command to generate the output. Assume that the vector $C$ is already defined in your Matlab command window, but that $N$ is unknown (so you need to determine it).

(a) (10 pts) Draw a flowchart that represents this task (you may assume here that the value of $N$ is known and can be input to the flowchart).

(b) (10 pts) Write a program called coins1.m that accomplishes this task by using for loops but no while loops.

(c) (10 pts) Write a program called coins2.m that accomplishes the task using while loops, but no for loops.

Submit a hard copy of this assignment, and also email these two programs to Lester as attachments to a message with the exact subject line Freshman HW09.