HW1.4

(1) To catch the bugs, in addition to the monitor p, I wrote four more monitors to catch the bugs. The following are the descriptions of them:

1. Monitor p : The monitor is to catch the bug if the customer input the correct amount of money, but the machine cannot make the change, it will output wrong amount of refund for the customer. Using random simulation with 100,000 cycles, I found the bug cannot be triggered. As a result, I think the bug in the original design is fixed.
2. Monitor q, r, s : The three monitors are checking if the machine outputs Item A, B, C, it will make the correct change respectively. After the random simulation, the monitors are not triggered at all. Thus, I think there is no trivial bugs for the cases.
3. Monitor t : The monitor is to detect if the machine is not typing out ITEM_NONE, the item type out should be the same as the item typed in under `SERVICE_ON. This monitor is also not triggered during the simulation, so I think there is also no trivial bug related to this condition.

(2) The simulation pattern generator is under vending-simple/debug/input_gen.py. The code generates input patterns that first reset the circuit, and then input random number of money and items. Note that I restrict the input item to be 01, 10, 11 only, that is, the input item should not be none. I set this restriction because the spec said that the machine will not accept money input when the input item is none. I also wrote another code under vending-simple/debug/output_check.py. The code help me to monitor if any of the monitors is triggered during the simulation. After all, the vending-fixed.v is not triggering any of the monitor during the simulation. The results is as follows :