First I generate more patterns (myinput3.pattern) and observe the behavior of many pins and wires by verdi and found that they all act as expected, no error was found.

Then I use the verify command (umc) in v3 to monitor the safety pin “p”, founding no error as well.

```
Inductive Invariant found at depth = 30  (time = 26.378  sec)
```

To verify the circuit solidlier, I added more properties (pA, pB, and pC), where they represent that when the machine finish finding changes, the changes should be right, that is “inputValue” - cost of the Item. It turned out that the properties are all preserved by testing with v3 verify command.

```
assign pA = initialized && (serviceTypeOut == `SERVICE_OFF) && (itemTypeOut == `ITEM_A) && (outExchange != (inputValue-`COST_A) );
assign pB = initialized && (serviceTypeOut == `SERVICE_OFF) && (itemTypeOut == `ITEM_B) && (outExchange != (inputValue-`COST_B) );
assign pC = initialized && (serviceTypeOut == `SERVICE_OFF) && (itemTypeOut == `ITEM_C) && (outExchange != (inputValue-`COST_C) );
```

Therefore, I think the code is good, no more bugs.