4. Vending Machine:

Design a vending machine where a user can order a tea, cookies ,coffee, 3 varieties of candies and 4 varieties of chocolates which cost $5, $20, $7, $10/-, $20/-, $25/-, $ 30, $ 10, $25 and $50/-, respectively, for each of these items. We assume that the amount of money that can be inserted at a time is $1, $ 2, $ 5, $ 10, or by credit/debit card. So, if the user wants to enter a higher amount, then they have to enter it multiple times. The user is also provided with a return money option so that at the end of their transaction they can take the remaining money (if more was inserted). The user can make 3 transactions at a time and they can take the change at the end of their operation.
In case of multiple options to return change the vending machine must choose the one that has the minimum number of coins to be dispatched. Eg: $ 20/- can be dispatched as 1 $ 20/- note, two ten dollar notes or or 20 one dollar coins. The vending machine must give priority for $.20/- note as it requires only one note to be dispatched and in case $20 rupee notes are not available then it should go for the second option.
Design your own functionalities in the test-bench for simulating the components as well as the overall system. Also, please make valid/necessary assumptions (if you require).

Inputs:

1. m0: input indicating $.10/- has been inserted
2. M1: input indicating that $.1/- has been inserted
3. M2: input indicating that $. 2/- has been has inserted
4. M3: input indicating that $.5/- has been inserted.
5. M4: input indicating that a credit card has been swiped/
6. M5: input indicating that a debit card was used.
7. ti: input indicating that user wants tea
8. wi: input indicating that user wants a cookie
9. ci: input indicating that user wants coffee
10. B1: input indicating that user wants candy typ1
11. B2: input indicating that user wants candy type 2
12. B3: input indicating that user wants candy type 3
13. C1: input indicating that user wants chocolate type 1
14. C2: input indicating that user wants chocolate type 2
15. C3: input indicating that user wants chocolate type 3
16. C4: input indicating that user wants chocolate type 4
17. rr: input indicating that change should be dispatched (end of his/her transaction)

Outputs:

1. so[10]: output indicating that a particular item is out of stock (shelf empty)
2. T0: Indicates tea has been served.
3. Wo: output indicating that water has been served to the user
4. Co: output indicating that coffee has been served to the user
5. Bo[3]: output indicating that candy X has been served to the user
6. C[4]: output indicating that chocolate type X has been served to the user
7. RRo: output indicating the returned money
    1. RR0 = 0, if no money is returned

2. RRo = 1, if $10/- is returned
3. RRo = 2, if $ 20/- is returned
4. RRo=3,if $2/- is returned
5. RRo =4 if $5/- is returned
6. RRo=5 if $1/- is returned