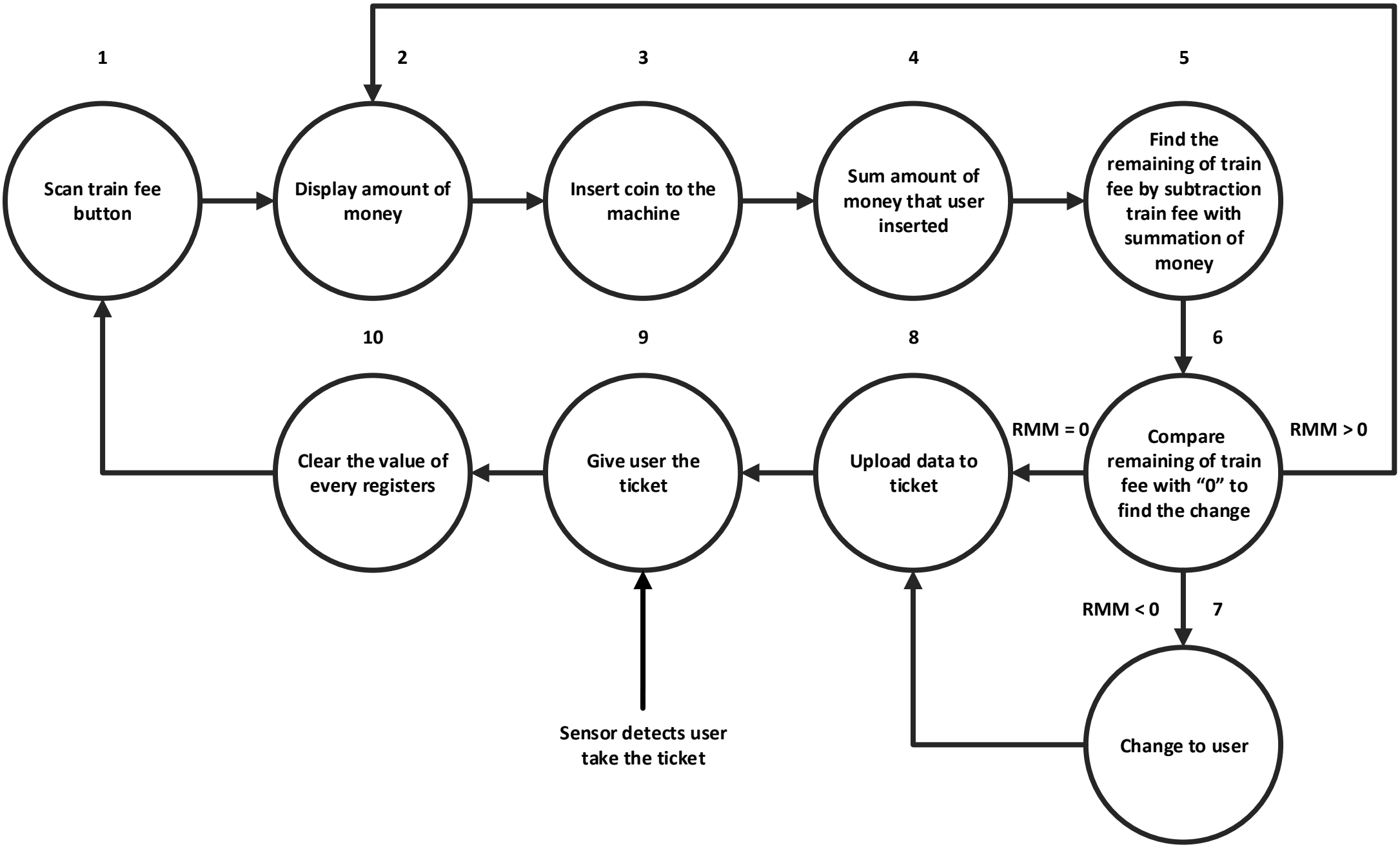


Figure 1. Main state diagram

The first state is button scanning of train fee to define the train fee which is destination and the maximum number of stations that user can go (main_state = 4'b0000).

Input button (8 bits)  This register use to  feed the button signal to sub-state1.

Output DATA_out1 (8 bits) The data output of sub-state1 is send by this port to main state.
out_RDY2 (1 bit) The output data flag.
state_cmp1 (1 bit) State complete flag.

Register  train_fee (8 bits)  to store the train fee that user selected.
NMS ( 8 bits) to store the maximum number of stations that user can go.

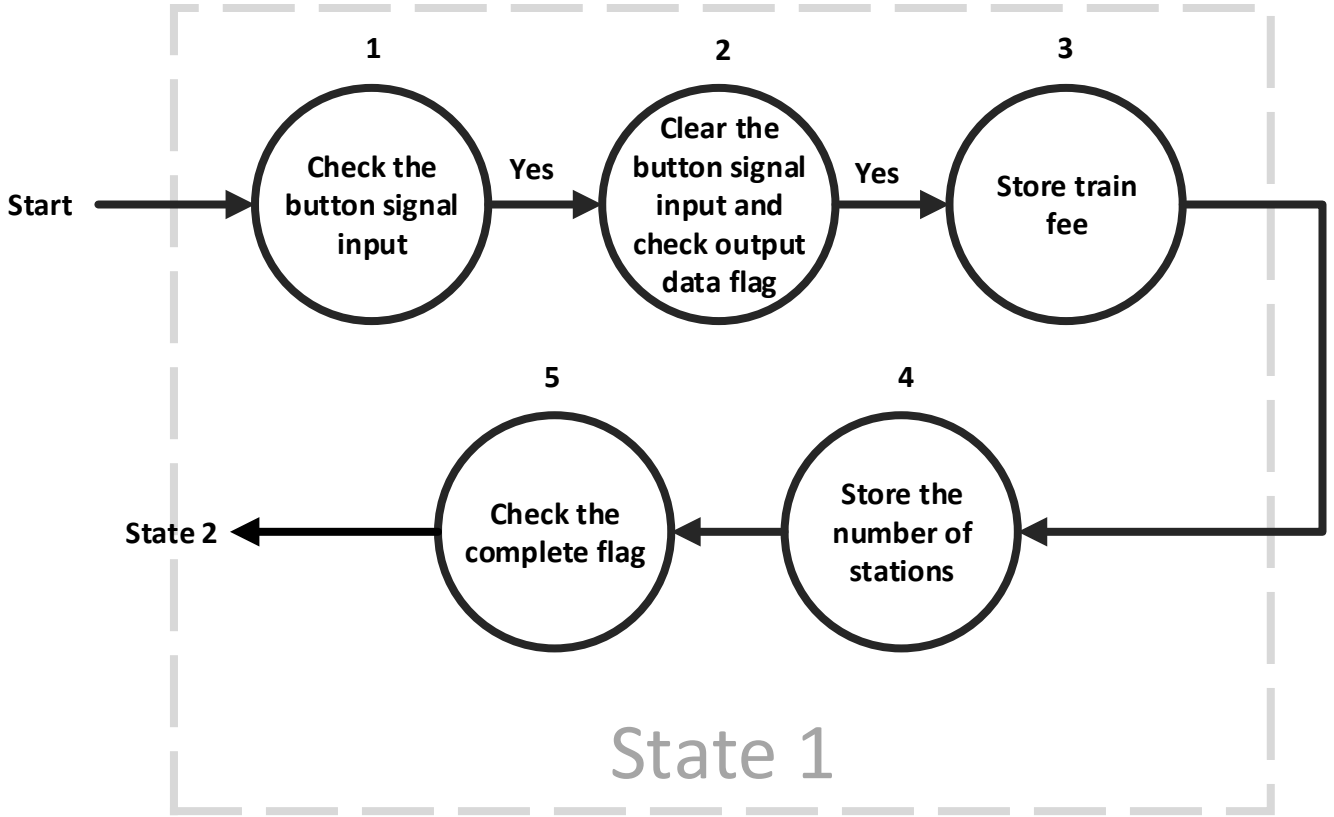


Figure 2. State diagram of state 1

**The second state is to display amount of money on the screen that user have to insert the coins to machine(main_state = 4'b0001).**

**Input DATA_in2 ( 8 bits) to send train fee the display module.**
**in_RDY2 (1 bit) The input data flag.**

**Output out_RDY2 (1 bit) The output data flag.**
**state_cmp2 (1 bit) State complete flag.**

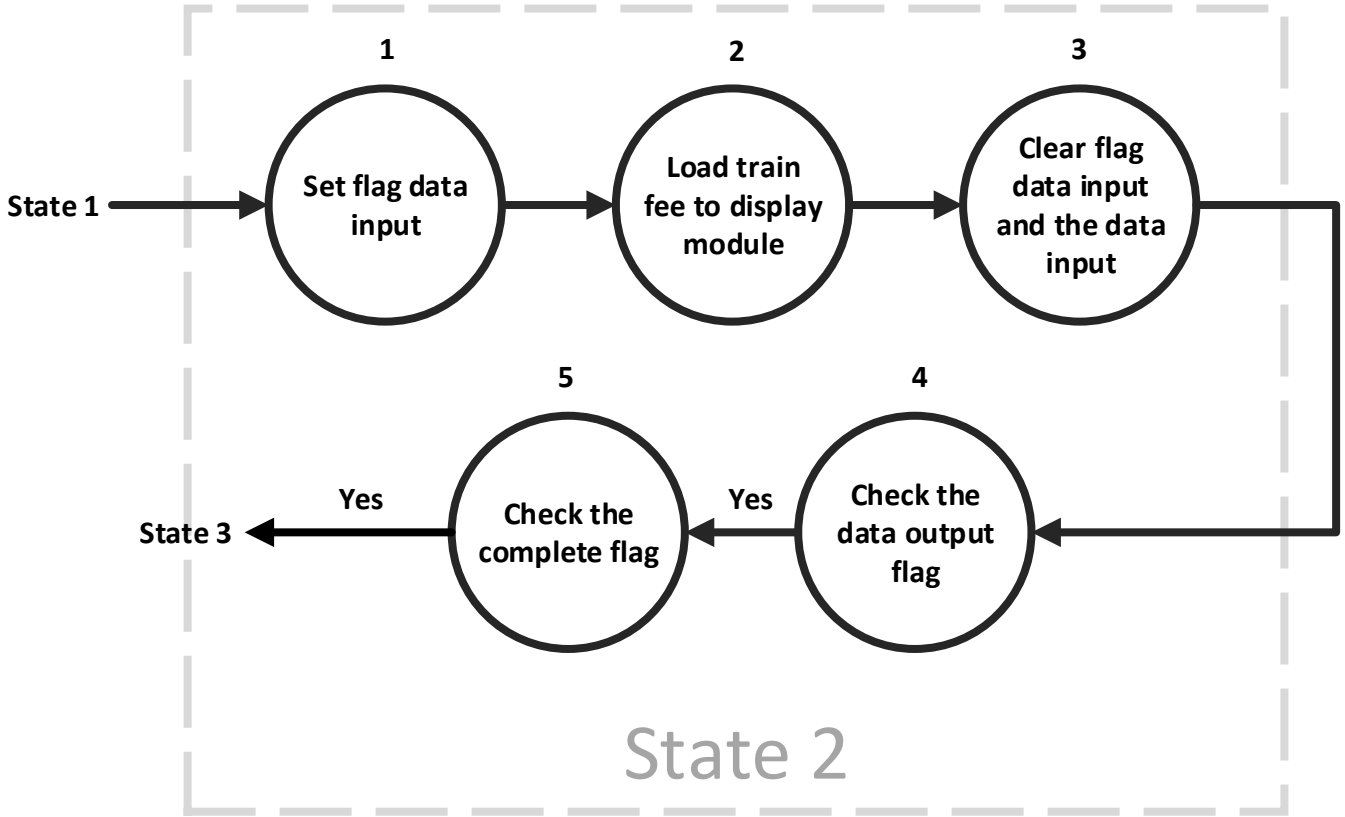


**Figure 3. State diagram of state 2**

**The third state is to insert the coins to machine (main_state = 4'b0010).**

**Input coin_in ( 8 bits)  This register use to  feed the coin signal to sub-state3.**

**Output DATA_out3 (8 bits) The data output of sub-state3 is send by this port to main state.**
**out_RDY3 (1 bit) The output data flag.**
**state_cmp3 (1 bit) State complete flag.**

**Register coin_m ( 8 bits) (8 bits)  to store amount of money that is inserted.**

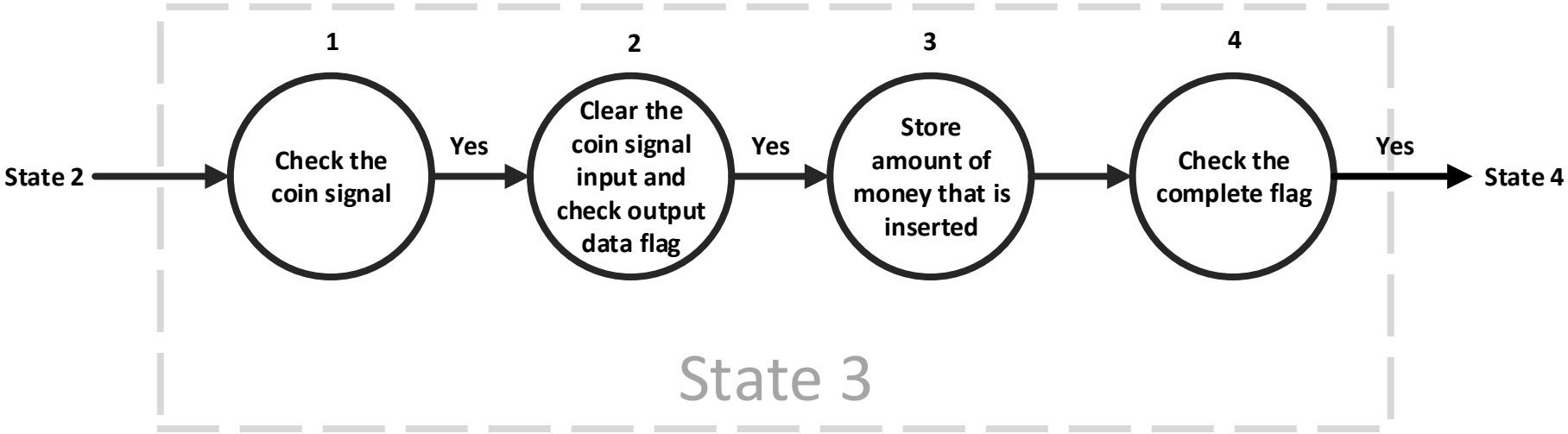


**Figure 4. State diagram of state 3**

**The fourth state is to calculate the total amount of money (main_state = 4'b0011).**

**Input DATA_in4 (8 bits) to find the summation of money that user inserted.**
**in_RDY4 (1 bit) The input data flag.**

**Output DATA_out4 (8 bits) The data output of sub-state5 is send by this port to main state.**
**out_RDY4 (1 bit) The output data flag.**
**state_cmp4 (1 bit) State complete flag.**

**Register money (8 bits) to store the summation of money.**

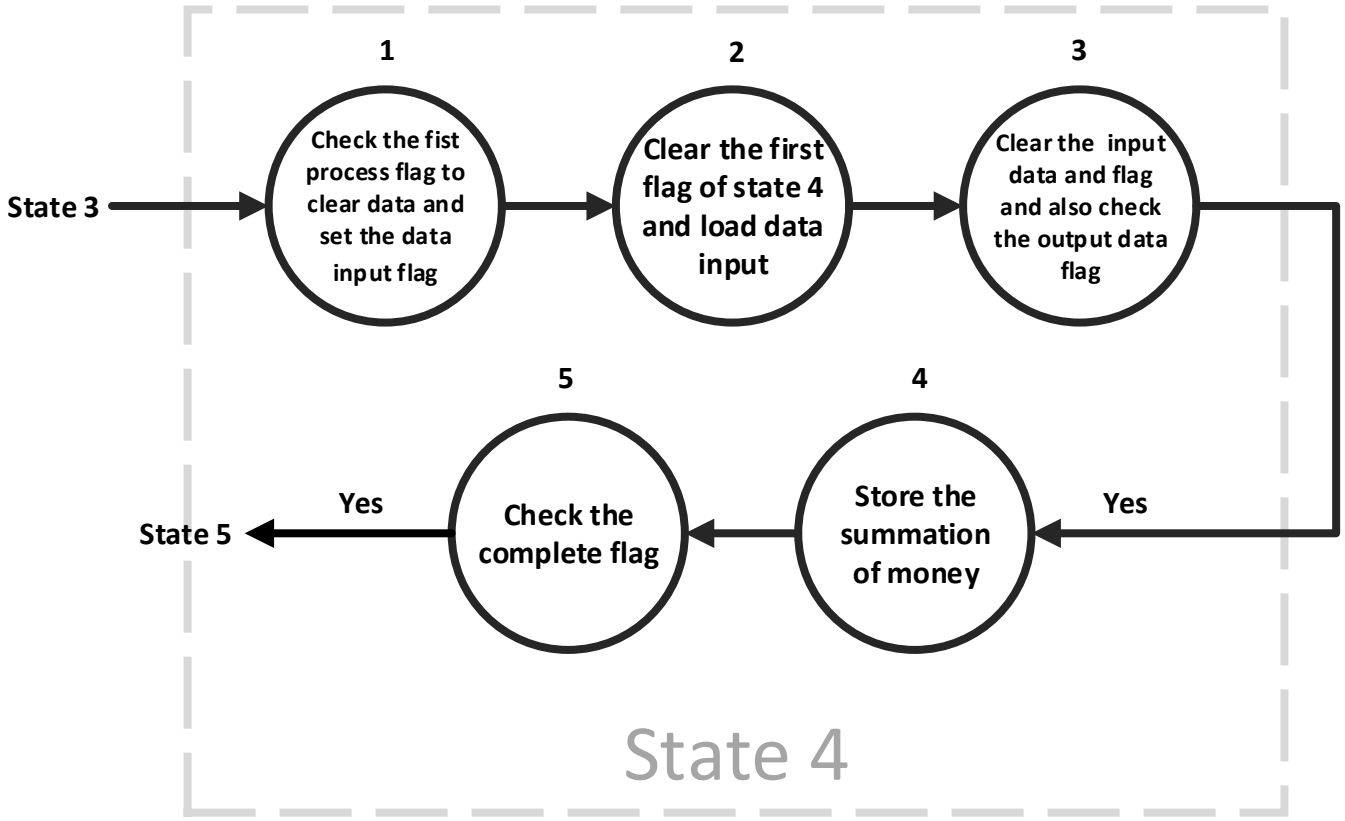


**Figure 5. State diagram of state 4**

The fifth state is to find the remaining of train fee by subtraction (main_state = 4'b0100).

Input DATA_in5 ( 8 bits) to find the remaining of money that user inserted.
in_RDY5 (1 bit) The input data flag.

Output DATA_out5 (8 bits) The data output of sub-state5 is send by this port to main state.
out_RDY5 (1 bit) The output data flag.
state_cmp5 (1 bit) State complete flag.

Register rmm (8 bits) to store the remaining of money. (signed)

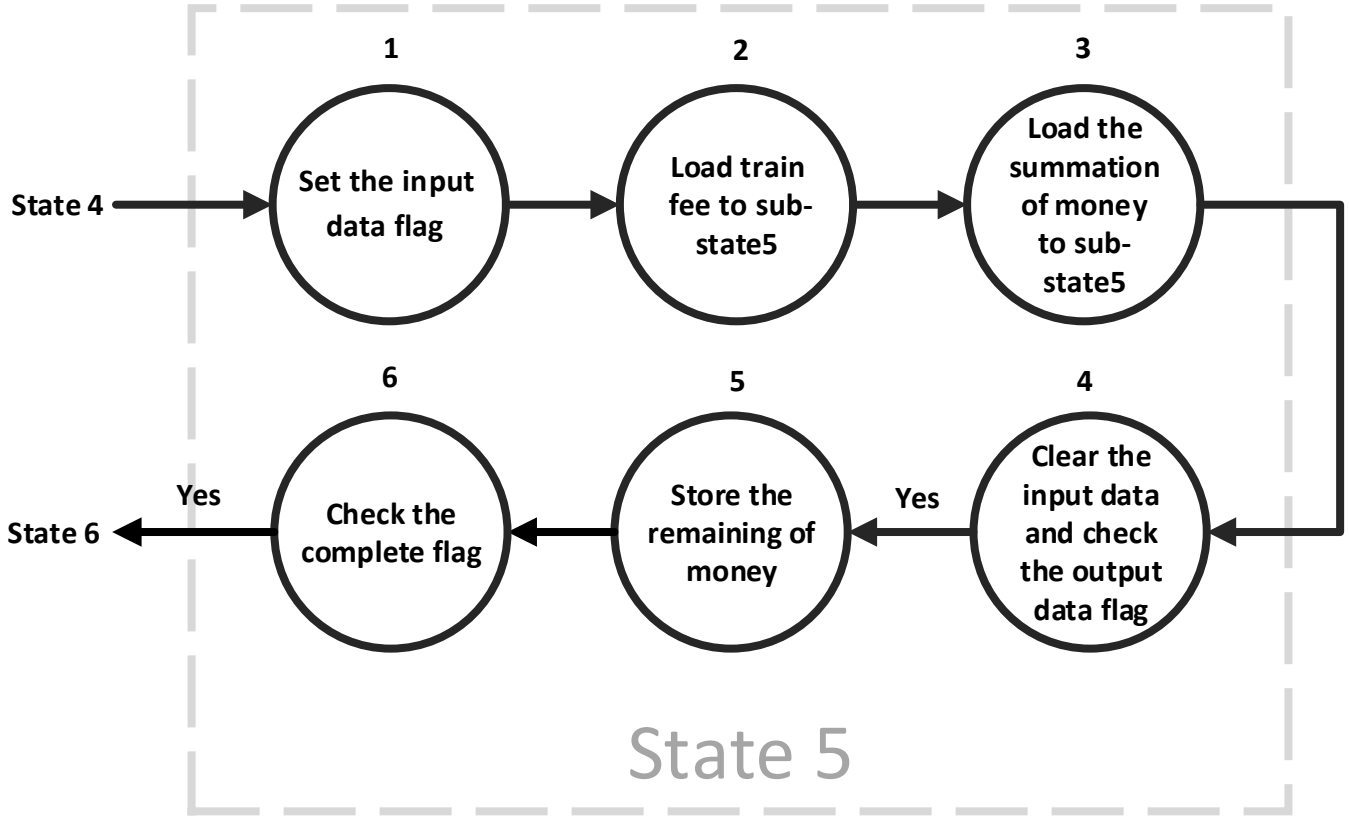


Figure 6. State diagram of state 5

The sixth state is to check whether there is the change or not by compare with 0 (main_state = 4'b0101).

Input DATA_in6 ( 8 bits) to find the remaining of money that user inserted.
in_RDY6 (1 bit) The input data flag.

Output DATA_out6 (8 bits) The data output of sub-state5 is send by this port to main state.
out_RDY6 (1 bit) The output data flag.
state_cmp6 (1 bit) State complete flag.

Register data_mem1 (8 bits) to store the result of comparison

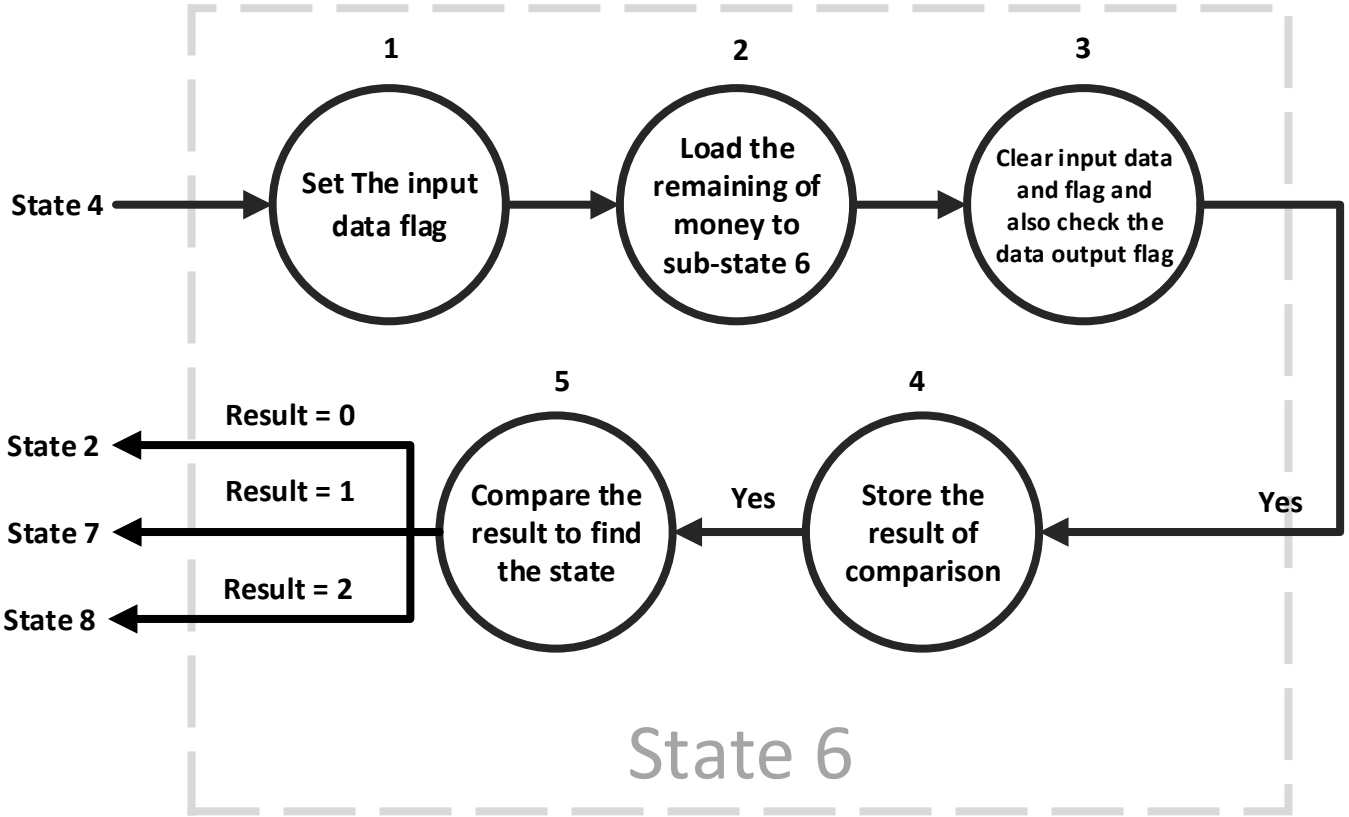


Figure 7. State diagram of state 6

**The third state is to give user the change (main_state = 4'b0110).**

**Input DATA_in7 ( 8 bits)  This register use to  feed the change to sub-state7.**

**Register  in_RDY7 (1bit) The input flag.**
**out_RDY3 (1 bit) The output data flag.**
**state_cmp3 (1 bit) State complete flag.**

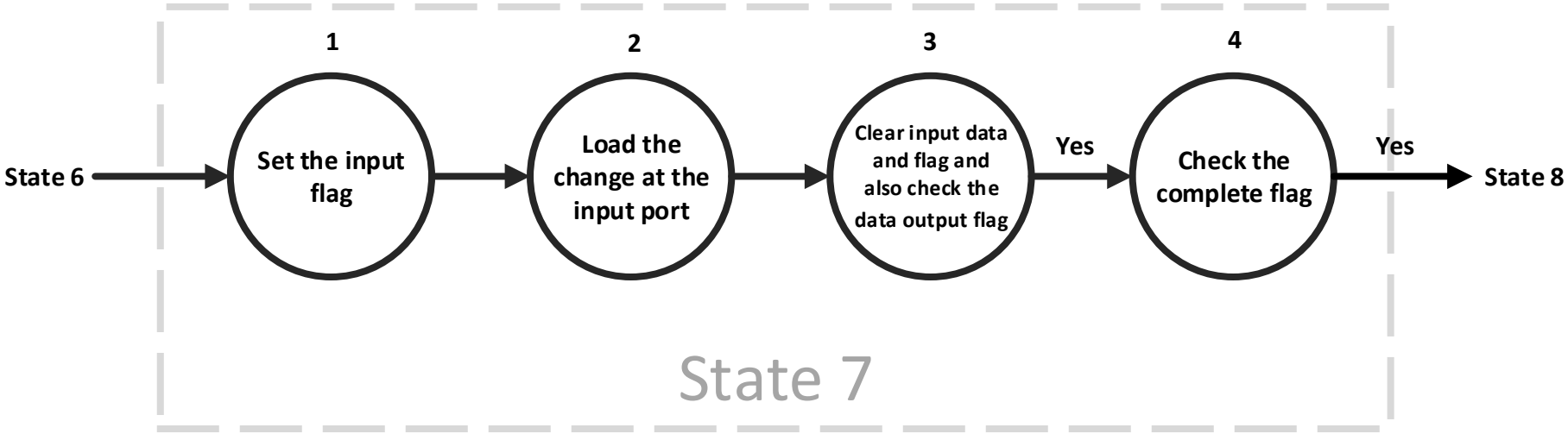


**Figure 8. State diagram of state 7**

**The eighth state is to upload data on the ticket (main_state = 4'b0111).**

**Input DATA_in8 ( 8 bits) This register use to feed the change to sub-state8.**
**in_RDY8 (1bit) The input flag.**

**Register out_RDY8 (1 bit) The output data flag.**
**state_cmp8 (1 bit) State complete flag.**

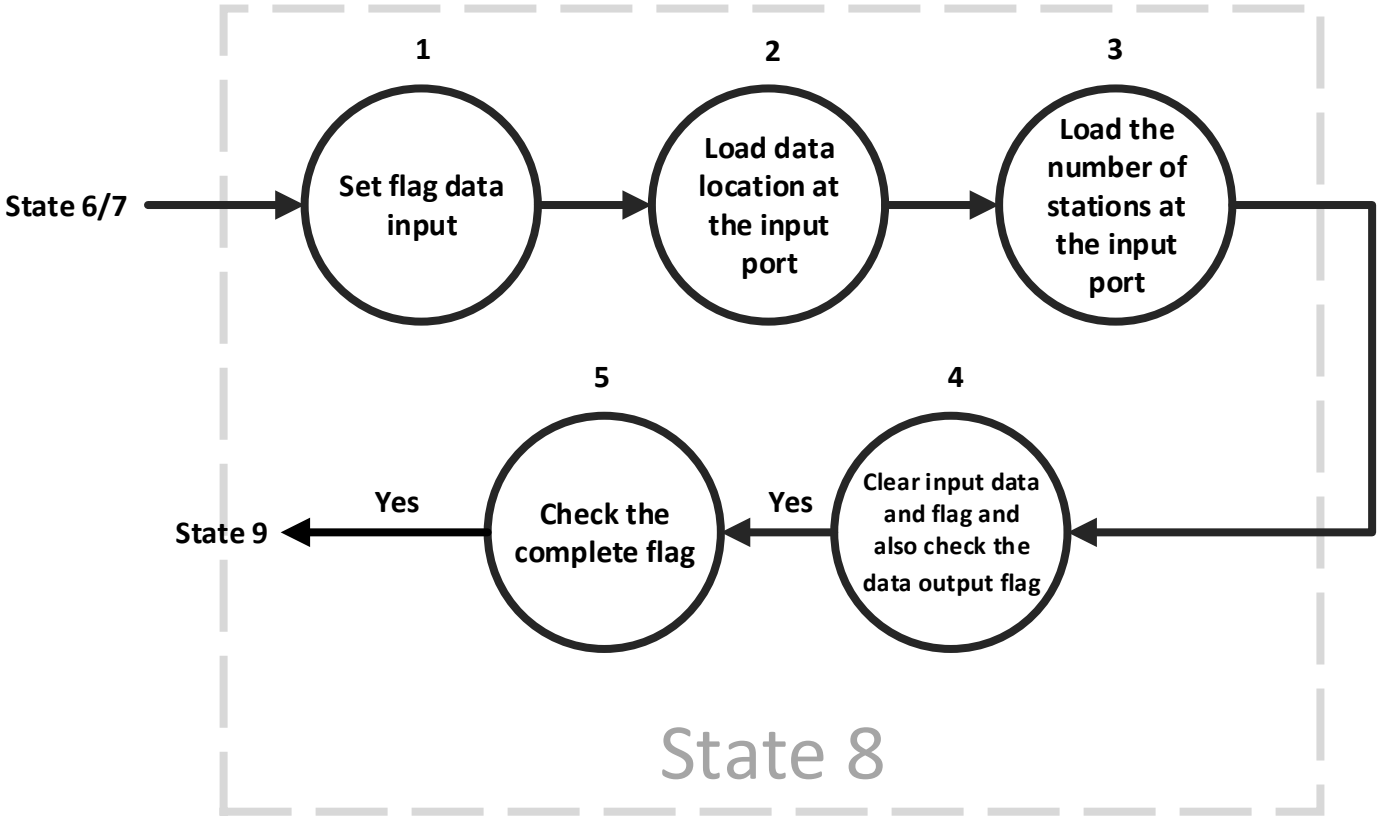


**Figure 9. State diagram of state 8**

**The ninth state is to give user the ticket (main_state = 4'b1000).**

**Input in_RDY9 (1bit) The input flag.**

**Output out_RDY9 (1 bit) The output data flag.**
**state_cmp9 (1 bit) State complete flag.**

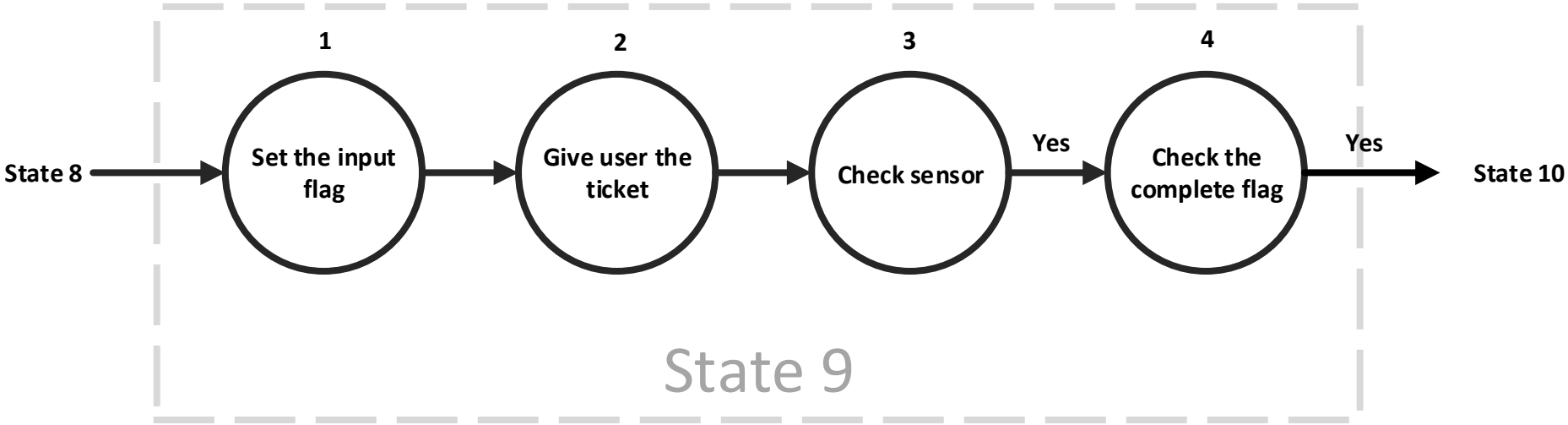


**Figure 10. State diagram of state 9**

**The tenth  state is to clear every value of register in the main function (main_state = 4'b1001).**
**Register state_cmpm (1 bit)**
**return_state, main_state, sub_main_state (4 bits)**
**frt_fg (1 bit)**
**data_(8 bits)**
**rmm, train_fee, NMS, money, mem1   (8 bits)**

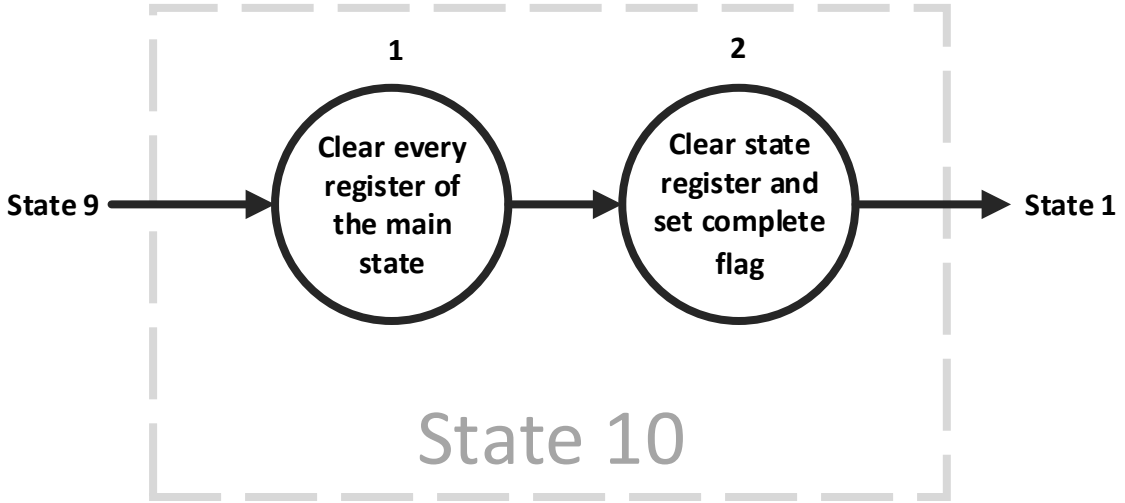


**Figure 11. State diagram of state 10**

**State 11 will be enable by user when they want to reset the process before the ticket machine complete.**

**This reset button cover only state1 – state 5, and the first condition is to find amount of money that user inserted to ticket machine.**

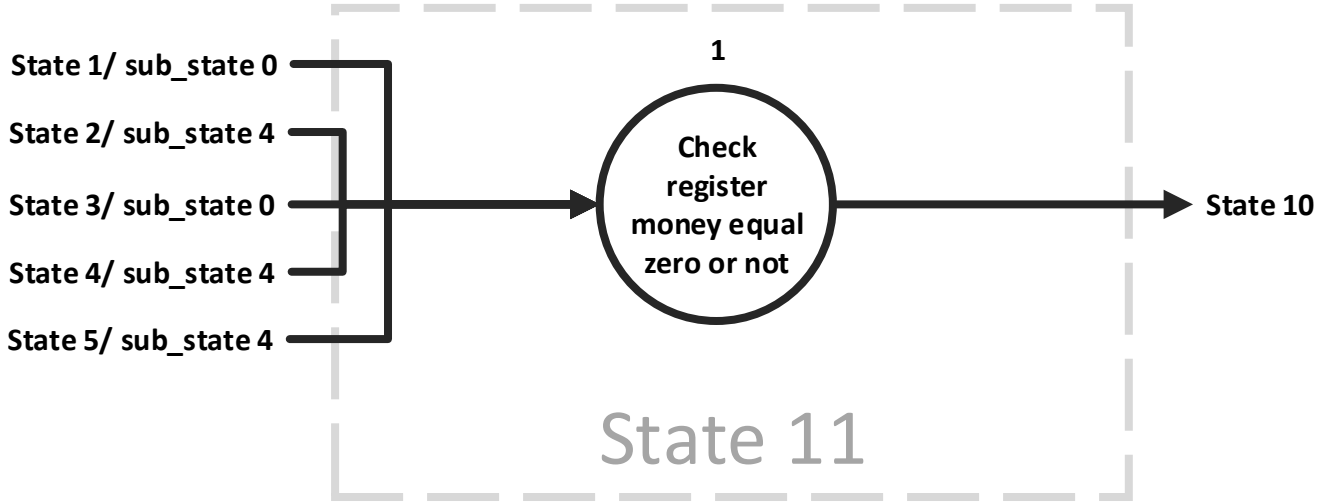


**Figure 12. State diagram of state 11**

**This diagram shows the sub program inside state 11. This state will fine amount of money that user inserted. In this case, if user inserted a coin, and left before the process complete. This state will give user back the money.**

**The sus-state11 works as state 7, and change the value of input.**

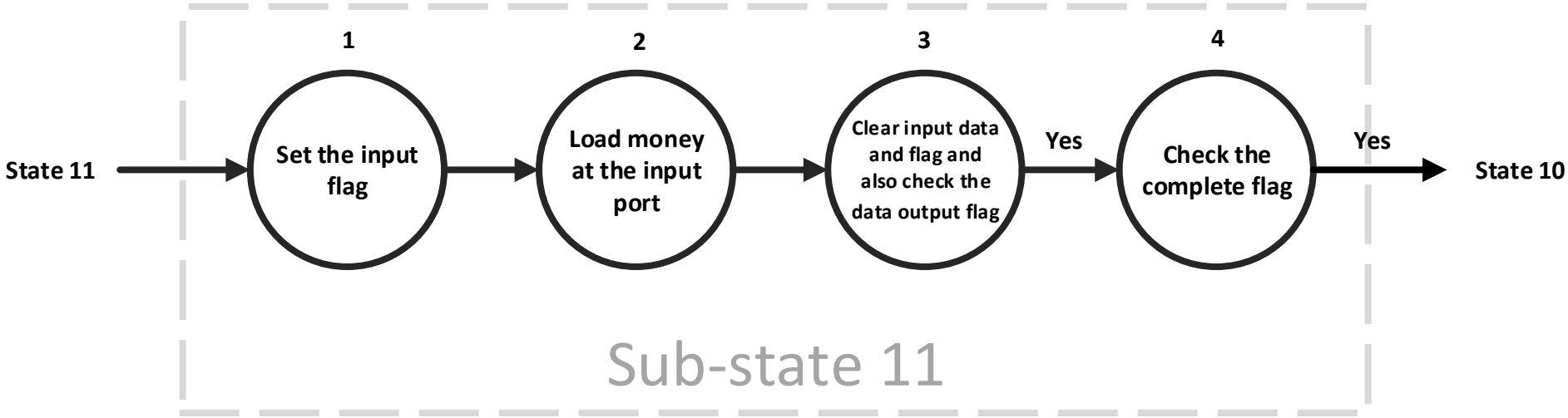


**Figure 13. State diagram of state 12**