Maintenance requirements

- Orange indicates that Cool maintenance is required.
  - Turn on cooling element for 3 clock cycles. This is achieved through the output bit [Fire, **Cool**, Plunge], on for 3 cycles.
- Blue indicates that Fire maintenance is required.
  - Since overheating is a problem, you must turn on the heating element for 2 clock cycles, then rest one cycle, then turn on for 2 more cycles, then rest for one cycle. This is achieved through the output bit [**Fire**, Cool, Plunge]
- Brown indicates that plunging maintenance is required.
  - Toggle plunger for 4 clock cycles. Toggle should follow high, low, high, low. This is achieved through the output bit [Fire, Cool, **Plunge**]. After plunging, burn off access garbage by turning on fire for one cycle [**Fire**, Cool, Plunge].
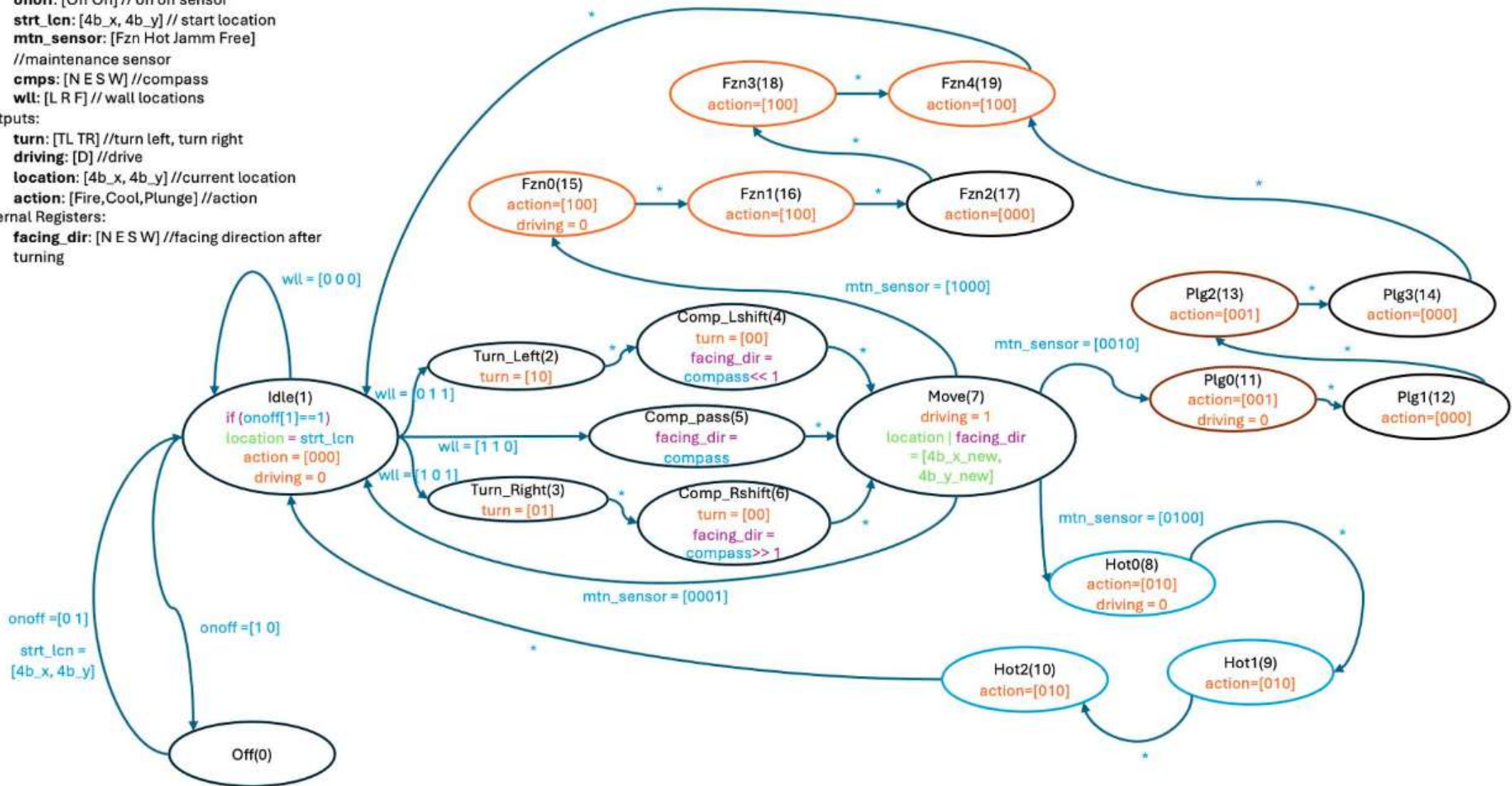
Inputs:
- **onoff**: [Off On] // on off sensor
- **strt_lcn**: [4b_x, 4b_y] // start location
- **mtn_sensor**: [Fzn Hot Jamm Free]
  //maintenance sensor
- **cmps**: [N E S W] //compass
- **wll**: [L R F] // wall locations

Outputs:
- **turn**: [TL TR] //turn left, turn right
- **driving**: [D] //drive
- **location**: [4b_x, 4b_y] //current location
- **action**: [Fire,Cool,Plunge] //action

Internal Registers:
- **facing_dir**: [N E S W] //facing direction after
  turning

Fzn3(18)
action=[100]

Fzn4(19)
action=[100]

Fzn0(15)
action=[100]
driving = 0

Fzn1(16)
action=[100]

Fzn2(17)
action=[000]

mtn_sensor = [1000]

Plg2(13)
action=[001]

Plg3(14)
action=[000]

mtn_sensor = [0010]

Idle(1)
if (onoff[1]==1)
location = strt_lcn
action = [000]
driving = 0

wll = [0 0 0]

wll = [0 1 1]

Turn_Left(2)
turn = [10]

Comp_Lshift(4)
turn = [00]
facing_dir =
compass<< 1

Comp_pass(5)
facing_dir =
compass

Move(7)
driving = 1
location | facing_dir
= [4b_x_new,
4b_y_new]

Plg0(11)
action=[001]
driving = 0

Plg1(12)
action=[000]

wll = [1 1 0]

wll = [1 0 1]

Turn_Right(3)
turn = [01]

Comp_Rshift(6)
turn = [00]
facing_dir =
compass>> 1

mtn_sensor = [0100]

Hot0(8)
action=[010]
driving = 0

mtn_sensor = [0001]

Hot2(10)
action=[010]

Hot1(9)
action=[010]

onoff =[0 1]
strt_lcn =
[4b_x, 4b_y]

onoff =[1 0]

Off(0)

inputs, reg outputs (if a change occurs), transitions, stored in register, output stored in FSM register too, state

Note: shifting operations must have continuous boundaries.

Robot Sensors and Actuators

Sensors

- On/Off
- Starting Location
- Maintenance Sensor
- Compass
- Wall Locations

Robot FSM

Actuators

- Flame thrower Plunger Cool Off
- Turn Left Turn Right
- Drive Forward
- Current Location Display

Memory Registers (Current Location, Facing Direction, State)