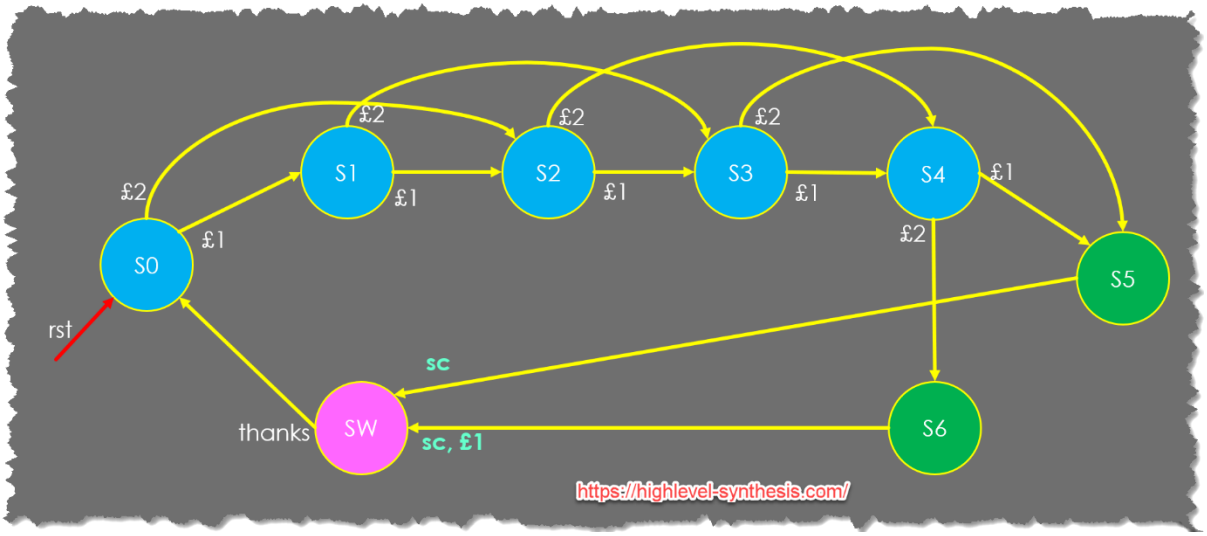
1 – The following FSM represents the vending machine behaviour.



And the following code describe the controller

```
typedef  enum states{s0, s1, s2, s3, s4, s5, s6, sw, } state_type;


void soda_can_vending_machine(
      bool        one_pound,
      bool        two_pound,

      bool        thanks_in,

      bool       &soda_can_out,
      bool       &one_pound_out )
{

#pragma HLS INTERFACE ap_none port=one_pound
#pragma HLS INTERFACE ap_none port=two_pound

#pragma HLS INTERFACE ap_none  port=thanks_in

#pragma HLS INTERFACE ap_none  port=soda_can_out
#pragma HLS INTERFACE ap_none  port=one_pound_out

#pragma HLS INTERFACE ap_ctrl_none port=return




      static state_type s=s0;

      state_type s_next;

      bool       soda_can_out_local;
      bool       one_pound_out_local;
```

```
switch(s) {
case s0:
	soda_can_out_local  = 0;
	one_pound_out_local = 0;

	if (one_pound == 1)
		s_next = s1;
	else if (two_pound == 1)
		s_next = s2;
	else
		s_next = s0;
	break;
case s1:
	soda_can_out_local  = 0;
	one_pound_out_local = 0;

	if (one_pound == 1)
		s_next = s2;
	else if (two_pound == 1)
		s_next = s3;
	else
		s_next = s1;
	break;
case s2:
	soda_can_out_local  = 0;
	one_pound_out_local = 0;

	if (one_pound == 1)
		s_next = s3;
	else if (two_pound == 1)
		s_next = s4;
	else
		s_next = s2;
	break;
case s3:
	soda_can_out_local  = 0;
	one_pound_out_local = 0;

	if (one_pound == 1)
		s_next = s4;
	else if (two_pound == 1)
		s_next = s5;
	else
		s_next = s3;
	break;
case s4:
	soda_can_out_local  = 0;
	one_pound_out_local = 0;

	if (one_pound == 1)
		s_next = s5;
	else if (two_pound == 1)
		s_next = s6;
	else
```

```
                s_next = s4;
            break;
      case s5:
            soda_can_out_local  = 1;
            one_pound_out_local = 0;
            s_next = sw;
            break;
      case s6:
            soda_can_out_local  = 1;
            one_pound_out_local = 1;
            s_next = sw;
            break;

      case sw:
            soda_can_out_local  = 0;
            one_pound_out_local = 0;

            if (thanks_in == 1)
                  s_next = s0;
            else
                  s_next = sw;
            break;
      default:
            break;
      }

      s = s_next;
      soda_can_out  = soda_can_out_local;
      one_pound_out = one_pound_out_local;


}
```