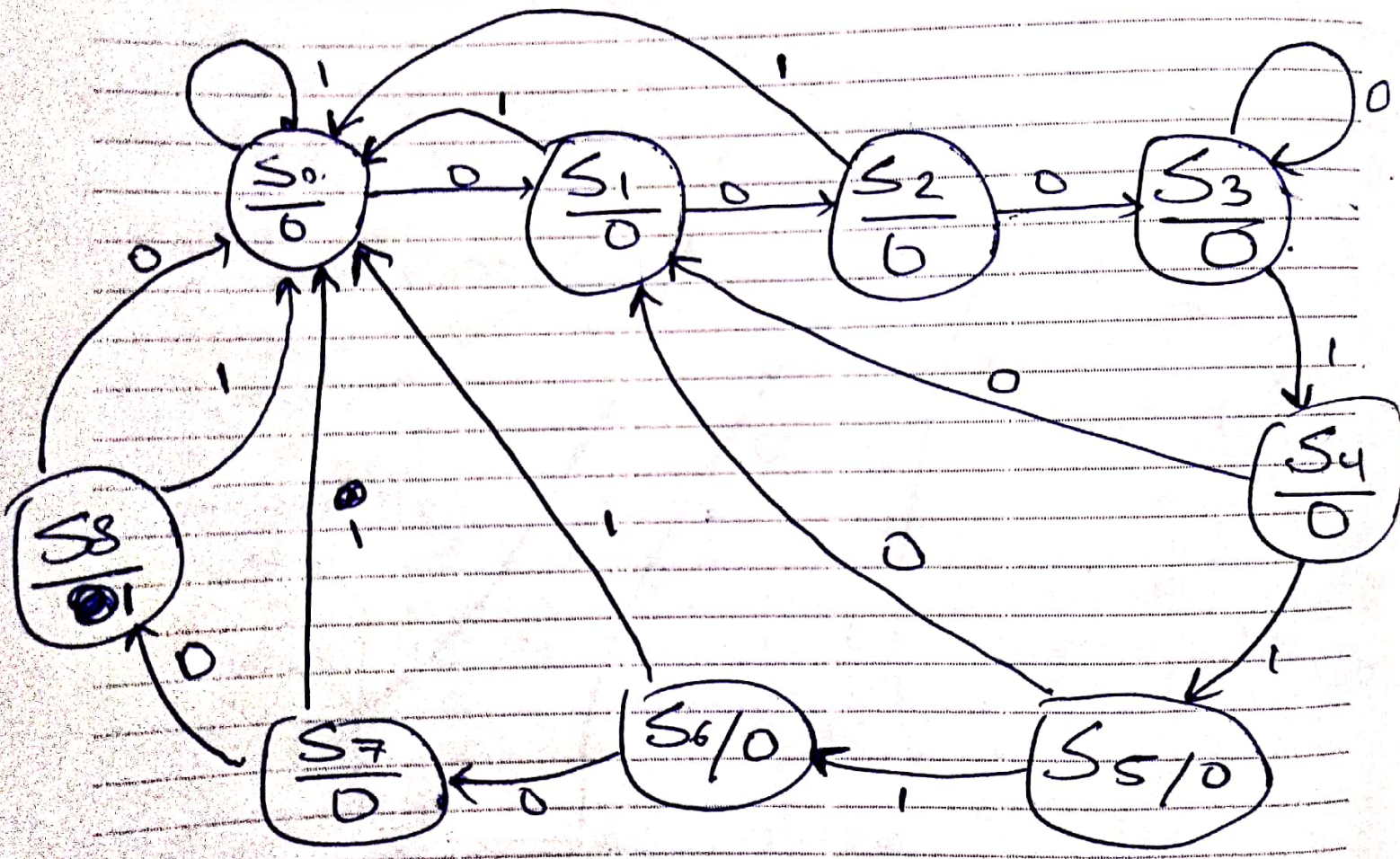


Roll - 17BEC008
AKSHAY MISHRA

Input Sequence - 00011100.



$S_1 = 0$ $S_2 = 00$ $S_3 = 000$

$S_4 = 0001$ $S_5 = 00011, S_6 = 000111$

$S_7 = 0001110$ $S_8 = 00011100$

State Table

Present State	NEXT STATE		PRESENT O/P
	X=0	X=1	
S ₀	S ₁	S ₀	0
S ₁	S ₂	S ₀	0
S ₂	S ₃	S₀ S ₀	0
S ₃	S ₃	S ₄	0
S ₄	S ₁	S ₅	0
S ₅	S ₁	S ₆	0
S ₆	S ₇	S ₀	0
S ₇	S ₈	S ₀	0
S ₈	S ₀	S ₀	1

I designed a Mealy FSM which requires total 9 states. Usually Mealy FSM requires one less than the Moore FSM.

So Mealy requires 8 states.

Qus 2

S ₁	1-2 0-0							
S ₂	1-3 0-0	2-3 0-0						
S ₃	1-3 0-4	2-3 0-4	3-6 0-0					
S ₄	1-5 0-5	2-1 0-5	3-1 0-5	8-1 4-5				
S ₅	1-1 0-6	2-1 0-6	3-1 0-6	3-1 4-6	1-1 5-6			
S ₆	1-7 0-0	2-7 0-0	3-7 0-0	3-7 4-0	1-7 5-0	1-7 6-0		
S ₇	1-8 0-0	2-8 0-0	3-8 0-0	3-8 4-0	1-8 5-0	1-8 6-0	2-8 0-0	
S ₈	X	X	X	X	X	X	X	X
	S ₀	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇

~~All star~~

All the states are differed
 and further reduction is
 not possible.

Remains unchanged.

0101000011106

~~010~~

$S_0 S_1 S_2 S_3 S_4 S_5 S_6 S_7 S_8$

O/P

0 0 0 0 0 0 0 0 0 0 0 0 0 0 1

Q3 State assignment using linear Binary coding.

S₀ - 0000, S₁ - 0001, S₂ - 0010, S₃ - 0011
 S₄ - 0100, S₅ - 0101, S₆ - 0110, S₇ - 0111
 S₈ - 1000.

	D _A	D _B	D _C	D _D	K	D _A ⁺	D _B ⁺	D _C ⁺	D _D ⁺	D _A	D _B	D _C	D _D
S ₀ 0	0	0	0	0	0	0	0	0	0	0	0	0	0
S ₁ 0	0	0	0	1	0	0	0	0	0	0	0	0	1
S ₂ 0	0	0	1	0	0	0	0	0	0	0	0	1	0
S ₃ 0	0	0	1	1	0	0	0	0	0	0	0	1	1
S ₄ 0	1	0	0	0	0	0	0	0	0	0	0	0	0
S ₅ 0	1	0	0	1	0	0	0	0	0	0	0	0	1
S ₆ 0	1	0	1	0	0	0	0	0	0	0	0	1	0
S ₇ 0	1	0	1	1	0	0	0	0	0	0	0	1	1
S ₈ 0	1	1	0	0	0	0	0	0	0	0	0	0	0
S ₉ 0	1	1	0	1	0	0	0	0	0	0	0	0	1
S ₁₀ 0	1	1	1	0	0	0	0	0	0	0	0	0	0
S ₁₁ 0	1	1	1	1	0	0	0	0	0	0	0	0	1
S ₁₂ 0	0	0	0	0	1	0	0	0	0	0	0	0	0
S ₁₃ 0	0	0	0	0	1	0	0	0	0	0	0	0	0
S ₁₄ 0	0	0	0	0	1	0	0	0	0	0	0	0	0
S ₁₅ 0	0	0	0	0	1	0	0	0	0	0	0	0	0
S ₁₆ 0	0	0	0	0	1	0	0	0	0	0	0	0	0
S ₁₇ 0	0	0	0	0	1	0	0	0	0	0	0	0	0
S ₁₈ 0	0	0	0	0	1	0	0	0	0	0	0	0	0
S ₁₉ 0	0	0	0	0	1	0	0	0	0	0	0	0	0

DA

$n=0$

$\overline{D}A\overline{B} \quad \overline{D}C\overline{D}$

	00	01	11	10
00	0	1	2	3
01	4	5	6	
11	X ₇	X ₁₄	X ₁₅	X ₅
10	X ₈	X ₉	X ₁₁	X ₁₂

$n=1$

	00	01	11	10
00				
01				
11				
10	X	X	X	X

$\overline{D}A = \overline{D}B\overline{C}\overline{D}n'$

DB

$\overline{D}A\overline{B} \quad \overline{D}C\overline{D}$

	00	01	11	10
00				
01				1
11	X	X	X	X
10	X	X	X	X

	00	01	11	10
00				
01				
11	X	X	X	X
10	X	X	X	X

$n=0$

$n=1$

~~$\overline{D}B = \overline{D}A\overline{B}\overline{C}\overline{D}n' + \overline{D}A\overline{B}\overline{C}n + \overline{D}A\overline{B}\overline{C}\overline{D}n$~~

$\overline{D}B\overline{C}\overline{D}n' + \overline{D}B\overline{C}n + \overline{D}B\overline{C}\overline{D}n$

D_c

	00	01	11	10
00	1	1	1	1
01				1
11	X	X	X	X
10	X	X	X	X

		1		
X	X	X	X	X
X	X	X	X	X

$\kappa = 0$

$\kappa = 1$

$$D_c = \bar{0}B\bar{0}D\bar{\kappa} + 0C\bar{0}D\bar{\kappa} + 0B\bar{0}C\bar{0}D\bar{\kappa}$$

D_D

	00	01	11	10
00	1		1	1
01	1	1		1
10	X	X	X	X
11	X	X	X	X

X	X	X	X	X
X	X	X	X	X

$\kappa = 0$

$\kappa = 1$

$$D_D = \bar{0}A\bar{0}D\bar{\kappa} + \bar{0}B\bar{0}C\bar{\kappa} + 0B\bar{0}C\bar{0}D + 0B\bar{0}C\bar{\kappa}$$

4

	00	01	11	10
00				
01				
11	X	X	X	X
10	1	X	X	X

	X	X	X	X
	1	X	X	X

$$y = \underline{DA}$$

$$DA = \bar{D}B\bar{D}C\bar{D}D\bar{X}$$

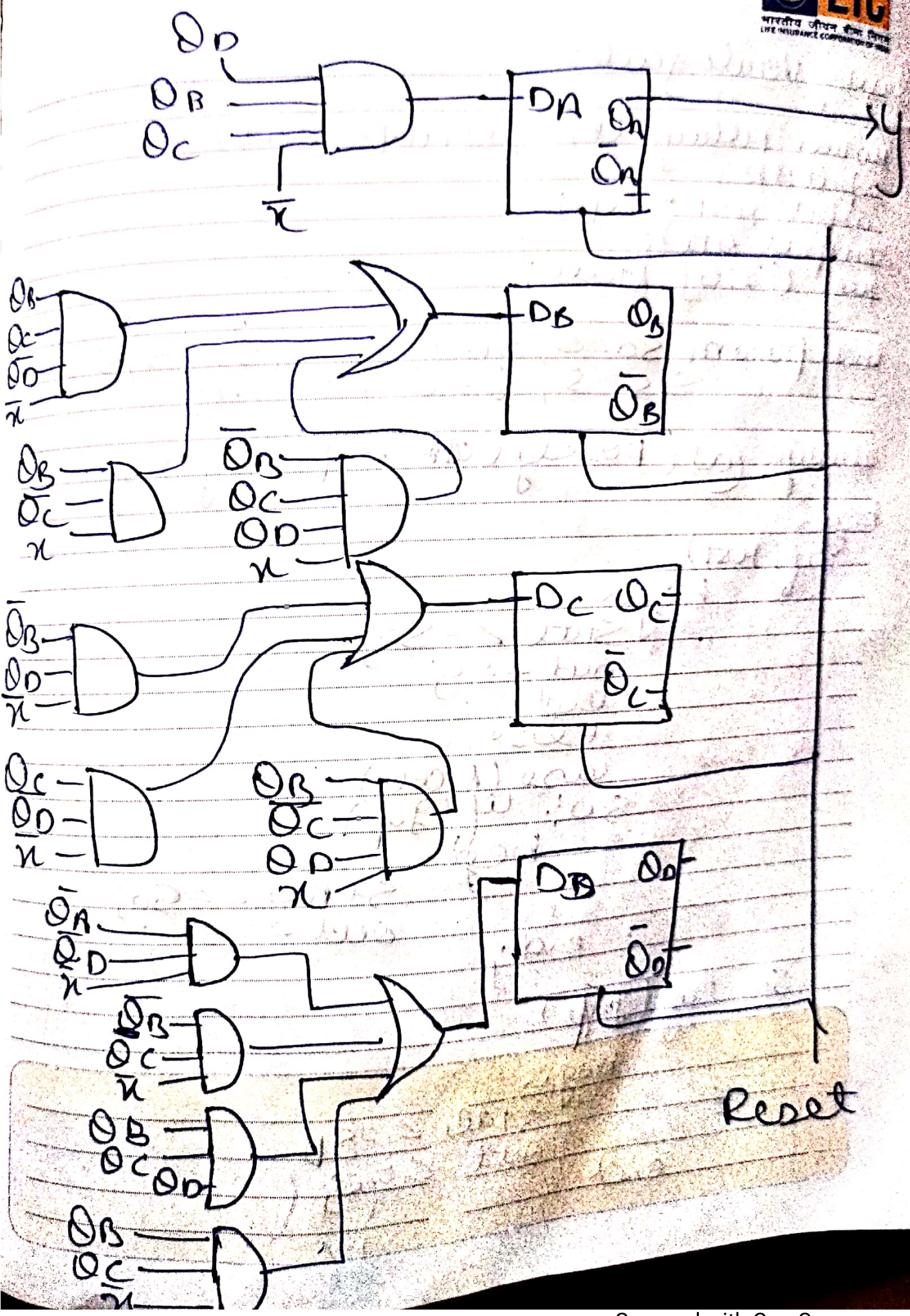
$$DB = \bar{D}B\bar{D}C\bar{D}D\bar{X} + \bar{D}B\bar{D}C\bar{D}DX + \bar{D}B\bar{D}C\bar{D}DX$$

$$DC = \bar{D}B\bar{D}D\bar{X} + \bar{D}C\bar{D}D\bar{X} + \bar{D}B\bar{D}C\bar{D}DX$$

$$DD = \bar{D}A\bar{D}D\bar{X} + \bar{D}B\bar{D}C\bar{D}X + \bar{D}B\bar{D}C\bar{D}D$$

$$+ \bar{D}B\bar{D}C\bar{D}X$$

$$y = DA$$





Ques 4 Verilog code:

```

Module Melay(clk, rst, inp, out)
  input clk;
  input rst;
  input inp;
  output out;
  reg [3:0] state;

```

local param S0=0, S1=1, S2=2, S3=3, S4=4
 S5=5, S6=6, S7=7;

```

always @ (posedge clk or posedge rst)

```

```

begin
  if (rst)
    begin
      state <= S0;
      out <= 0;
    end
  else
    case (state)
      S0: if (inp)
          begin
            state <= S0;
            out <= 0;
          end;
    end;

```

```

S1 : if (inp)
    begin
      state <= S1;
      out <= 0;
    end

```



```
else  
begin  
state ← S1  
out ← 0;  
end
```

```
S2: if (inp)  
begin  
state ← S0  
out ← 0;  
end
```

```
else begin  
state ← S2  
out ← 0;  
end
```

```
end
```

```
S3: if (inp)  
begin  
state ← S0  
out ← 0;  
end
```

```
else
```

```
state ← S3  
out ← 0;
```

```
end
```

```
S4: if (inp)  
begin
```

```
state ← S1;  
out ← 0;
```

```
end  
else
```



```

begin
  state ← S5
  out ← 0j
end

```

```

S5: if (inp)
  begin
    state ← S5
    out ← 0
  end

```

```

  else
    begin
      state ← S6
      out ← 0j
    end
  end

```

```

S6: if (inp)
  begin
    state ← S0
    out ←
  end

```

```

  else
    begin
      state ← S7
      out ←
    end
  end

```

```

S7: if (inp)
  begin
    state ← S0
    out ←
  end

```

```

  else
    state ← S7
    out ← 1
  end

```

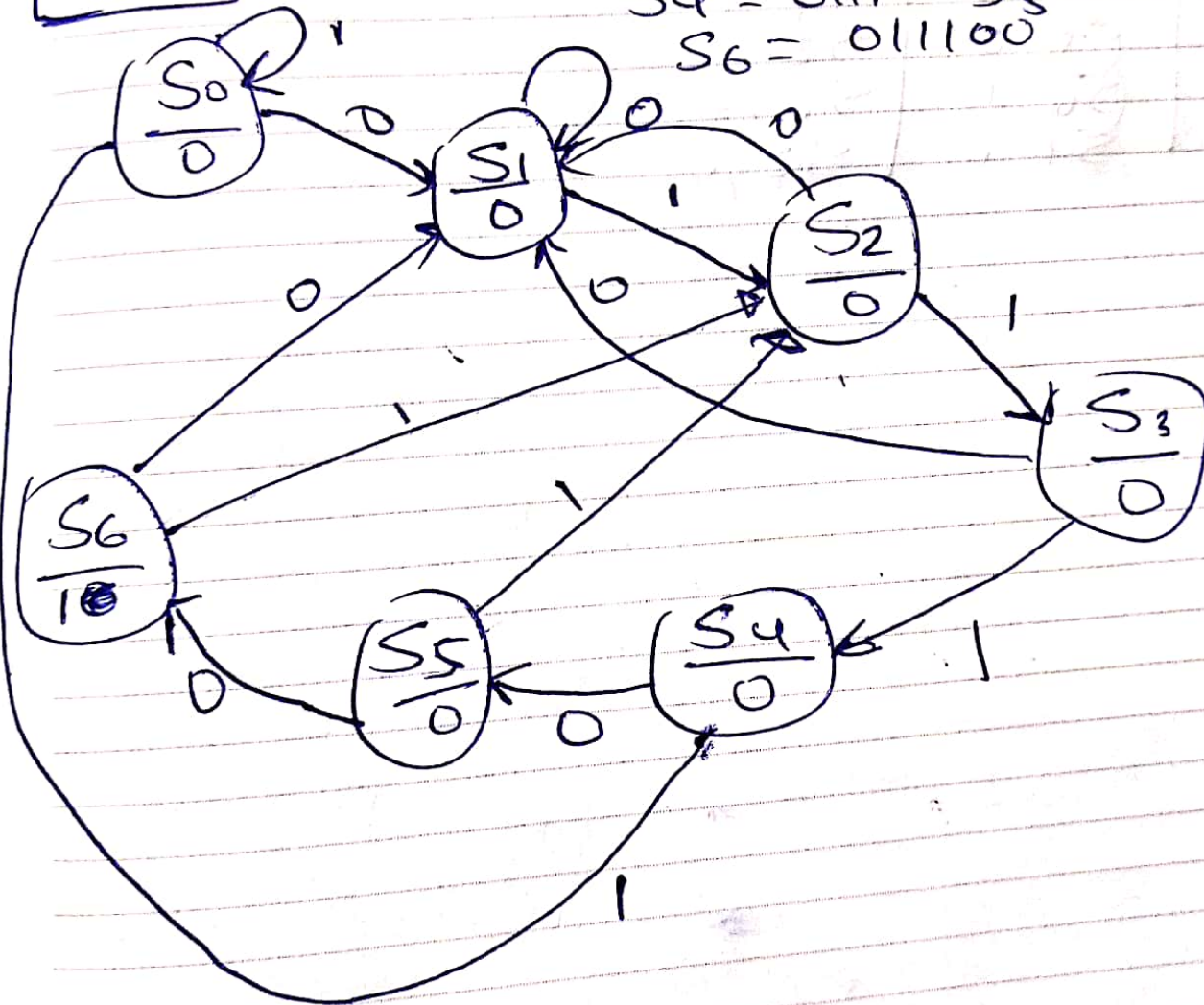
```

end

```


end case
end module.

Ques 5 011100. $S_1=0$ $S_2=01$, $S_3=011$
 $S_4=0111$ $S_5=01110$
 $S_6=011100$





भारतीय जीवन बीमा निगम
LIFE INSURANCE CORPORATION OF INDIA

Input

	0	1
S ₀	S ₀ , 1, 0	S ₀ , 1, 0
S ₁	S ₁ , 1, 0	S ₂ , 1, 0
S ₂	S ₀ , 1, 0	S ₃ , 1, 0
S ₃	S ₁ , 1, 0	S ₂ , 1, 0
S ₄	S ₀ , 1, 0	S ₂ , 1, 0
S ₅	S ₁ , 1, 0	S ₂ , 1, 0
S ₆	S ₁ , 1, 0	S ₂ , 1, 0