Lost SynchSM Design Problem (Solution)

CS/EE 120B

Lost











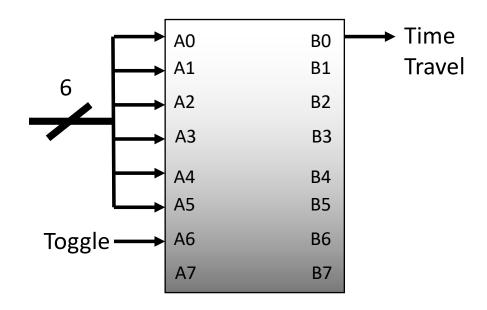
System Setup

Input

- A5-A0 Six-bit input
- A6 Reads A5-A0 when toggled

Output

B0 – Initiates time-travel



Functionality

- The system starts with a 108 minute countdown
- Inputs A0...A5 are read when the Toggle bit is set (A6 = 1)
 - They are **not** read if when the Toggle bit is not set (A6 = 0)
- The user must input the correct sequence of numbers (4, 8, 15, 16, 23, 42) to reset the countdown
- If the countdown reaches 0, assert B0 to initiate time travel
 - (Get stuck in a state with a self-loop)
- Use a 500ms (0.5 s) period

Quick Math

- 108 minutes
- $108 \times 60 = 6480$ seconds
- 6480 x 2 = 12,960 (1/2-seconds; clock period)
 - Represent this value using a <u>short</u>

SynchSM Design * Period = 500ms cnt--; unsigned short cnt; read = A & 0x40; unsigned char tmp; tmp = A & 3F; unsigned char read; cnt > 0 &&read && ** tmp != 42 cnt == 0&& (!read || tmp != 42) cnt > 0 & &read && tmp != 16 other other other cnt > 0 &&other cnt > 0 & &cnt > 0 & &read && read && read && tmp == 4tmp == 8 tmp == 16WAIT42 WAIT16 WAIT8 WAIT4 cnt > 0 &&cnt == 0 cnt == 0** 1 read && tmp!=8 cnt == 0TIME cnt = 12960 **TRAVEL** read && tmp == 42 **RESET**

(Infinitely Simpler) SynchSM Design

```
Period = 500ms
unsigned short cnt;
unsigned char i;
unsigned char tmp;
const unsigned char value[6] = {4, 8, 15, 16, 23, 42};
                                        cnt > 0 & k i < 6
                       i = 0
                       cnt = 12960;
                                                         cnt == 0 && i < 6
       B = 0
                                                                                TIME
                                              WAIT
               RESET
                                                                               TRAVEL
                              i == 6
                                            cnt--;
                                                                              B = 0x01;
                                            If( A & 0x40 ) {
                                                 tmp = A \& 0x3F;
                                                 if( tmp == value[i])
                                                      j++;
                                                 else
                                                      i = 0:
```