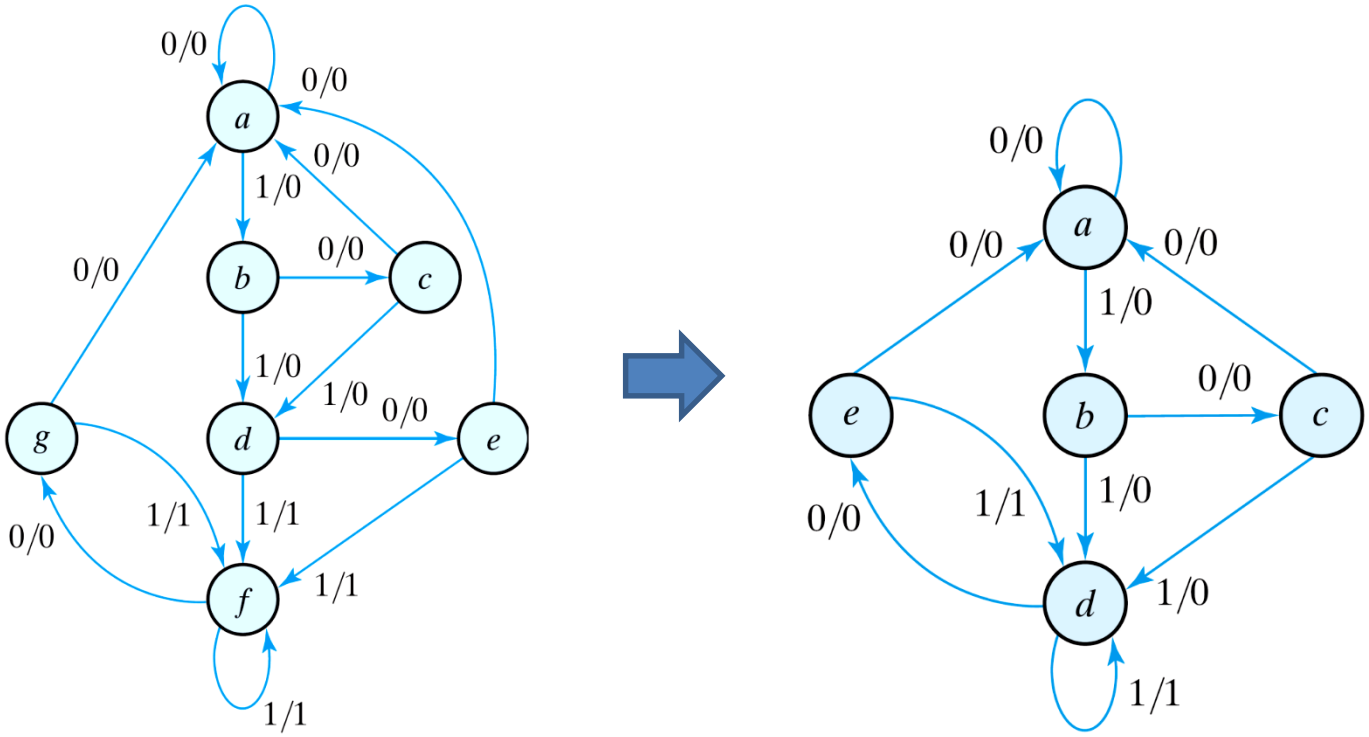
# Programming Assignment 3
# State Reduction for Sequential Circuits

# State reduction

- State reduction is a technique to reduce the state count in a state diagram



# Objective

- Develop a state reduction approach to optimize a state diagram/sequential circuit
- Input
  - A state diagram *S* in the KISS format
- Output
  - An optimized state diagram *S'* in the KISS format
- Requirement
  - $S \equiv S'$

# KISS format

.i <num-inputs>

.o <num-outputs>

.s <num-states>

.p <num-terms>

.r <reset-state>

<input> <current-state> <next-state> <output>

…

<input> <current-state> <next-state> <output>

.e

```
.i 2
.o 1
.s 6
.p 11
.r s0
00 s0 s1 0
01 s0 s2 1
10 s0 s3 1
11 s1 s2 0
01 s1 s5 0
10 s2 s4 0
00 s2 s3 0
01 s3 s4 1
11 s3 s5 1
01 s4 s5 0
11 s5 s0 0
.e
```

# Comments

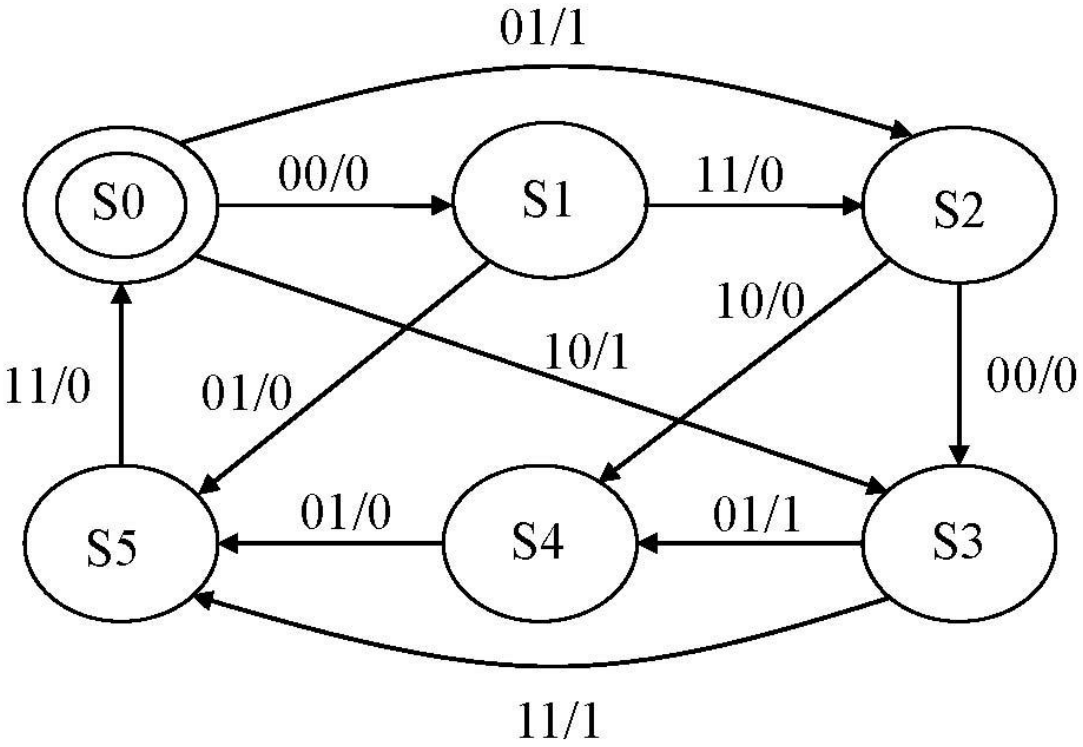
- In the beginning of the file, a "#" begins a comment that extends to the end of the current line
- Comments give a brief description of the circuit

```
# This is a comment
# Testcase #1

…
```

# Example

```
# This is a comment
.i 2
.o 1
.s 6
.p 11
.r s0
00 s0 s1 0
01 s0 s2 1
10 s0 s3 1
11 s1 s2 0
01 s1 s5 0
10 s2 s4 0
00 s2 s3 0
01 s3 s4 1
11 s3 s5 1
01 s4 s5 0
11 s5 s0 0
.e
```



# Notice

- For a state diagram, some state transitions may not be specified
  - i.e., don't cares
- Two states can be merged, if their specified transitions have no conflict
  - e.g., S5 and S0, S5 and S2, S5 and S4

# Requirements

- Your program should work correctly
- Your program should be executable compiled by Dev C++ or other legally licensed compliers

# Grading

- **You will get a full score, if you program reports the best result among all the students**
  - **Summation of the state counts of all benchmarks**

- **YOU WILL GET A VERY LOW SCORE, IF YOUR SOURCE CODE IS SIMILAR TO OTHERS**

# Delivery

- Due date
  - 1/2(Wed.) (two weeks)
  - Fixed due date, no late delivery is allowed
- Deliveries
  - Your source code(s)
  - A readme to describe how to run your program
  - Pictures show your execution results for the given testbenches by PrintScr