Developing a program (sketch)

Lecture 14

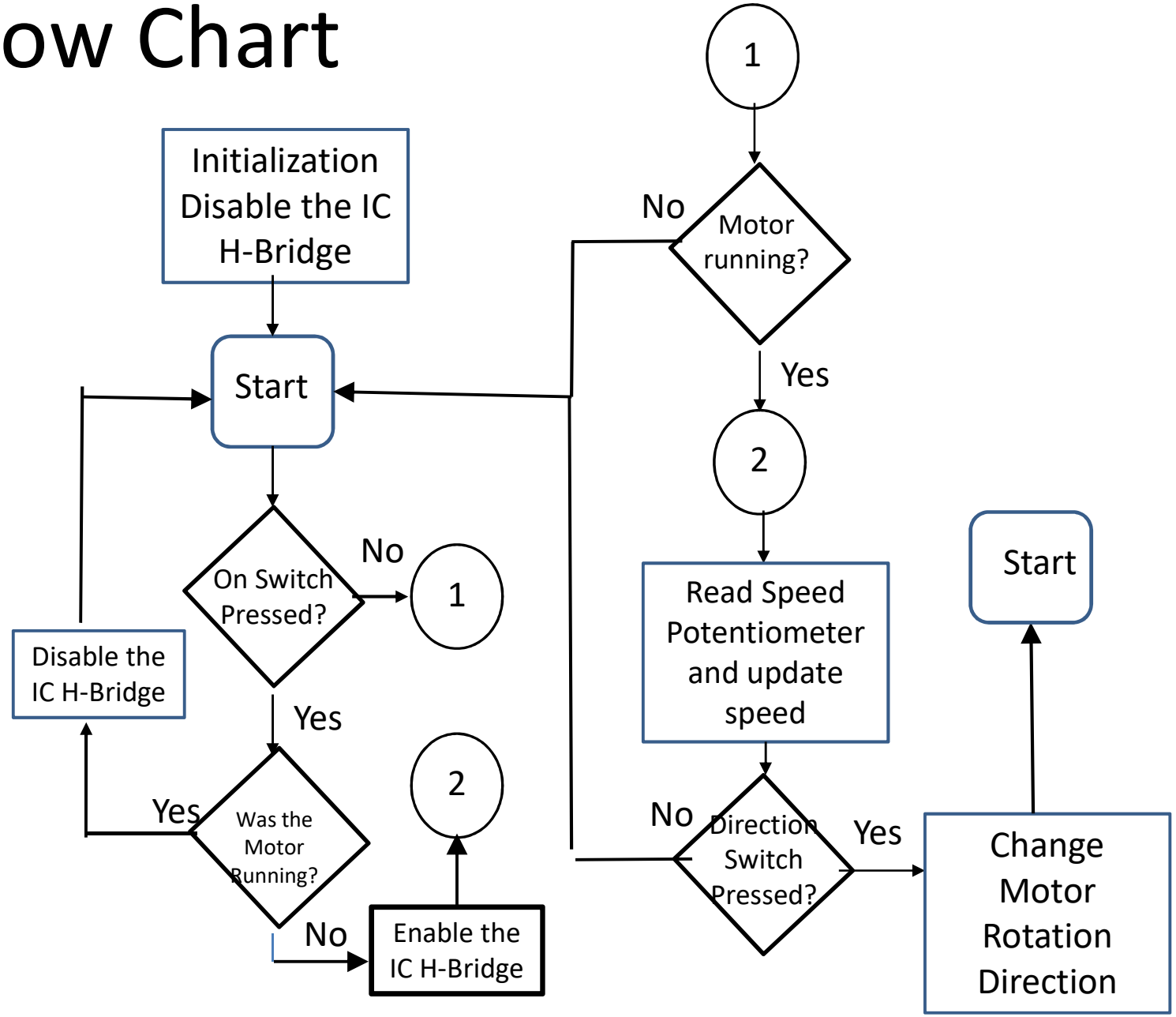
Steps to writing a program

1. Develop the program requirements
   a) Decide what the functionality of the program should be
   b) Decide on the conditions for proper operation
   c) Decide on the condition for improper operation
   d) Determine the inputs and outputs of the program
2. Determine the logic flow of the program by designing a flow chart
   a) Determine the initiation steps
   b) Determine the data flow from start to completion
      i. Determine the tests for the logic flow
      ii. Determine how the improper conditions should be handled
3. Develop the computer language statements based on the flow chart
4. Test the program operation based on the program requirements
5. Remember writing a program is also an ART.

Example Exercise 6 Motor control Requirements

1. There shall be a momentary switch to turn on the motor
2. There shall be a momentary switch to change the rotational direction of the motor
3. There shall be a potentiometer to control the speed of the monitor
4. The motor to be controlled shall be a DC motor
5. The method of controlling the speed and rotational direction of the motor shall be via a IC H-Bridge.
6. The main controller of this system shall be an Arduino UNO

Flow Chart


1
Initialization
Disable the IC
H-Bridge
No
Motor
running?
Start
Yes
2
On Switch
Pressed?
No
1
Start
Read Speed
Potentiometer
and update
speed
Disable the
IC H-Bridge
Yes
2
No
Direction
Switch
Pressed?
Yes
Yes
Was the
Motor
Running?
Change
Motor
Rotation
Direction
No
Enable the
IC H-Bridge

Use states

- State variable of the system
  - Motor enabled
  - ONOFF Switch
  - Dir Switch

State	Motor Enabled	Dir Switch	ON OFF Switch	action
1	0	0	0	do nothing
2	0	0	1	enable Motor
3	0	1	0	do nothing
4	0	1	1	do nothing
5	1	0	0	update speed
6	1	0	1	disable motor
7	1	1	0	Change direction and update speed
8	1	1	1	disable motor