```
%% Lab 2 Part A (1)
% Uses NXTMotor to move the robot forward, stop, and move backward to its
% original position
function lab2_a_1

  %% Move forward
  m = NXTMotor( [MOTOR_B; MOTOR_C] );
  m.Power = 30;
  m.TachoLimit = 1080;
  m.SendToNXT()
  m.WaitFor()

  %% Move backward
  m.Power = -30;
  m.SendToNXT()
  m.WaitFor()

end

% ================================================
% ================================================


%% Lab 2 Part A (2)
% Uses NXTMotor to rotate the robot 180 degrees in place.
function lab2_a_2

  %% Rotate
  l_wheel = NXTMotor( MOTOR_B );
  r_wheel = NXTMotor( MOTOR_C );

  l_wheel.Power = -30;
  r_wheel.Power = 30;

  l_wheel.TachoLimit = 550;
  r_wheel.TachoLimit = 550;

  l_wheel.SendToNXT()
  r_wheel.SendToNXT()

  l_wheel.WaitFor()
  r_wheel.WaitFor()

end

% ================================================
% ================================================


%% Lab 2 Part B
% Uses NXT_GetOutput state to monitor the rotation of a motor.
function lab2_b
```

```
  %% Read motor state
  s = NXT_GetOutputState( MOTOR_B );
  disp( s.TachoCount )

end

% ======================================================
% ======================================================
% ======================================================
% ======================================================


%% Lab 3 Part A
% Gets reading from touch sensor
function lab3_a

  %% Get sensor reading
  OpenSwitch( SENSOR_1 )
  GetSwitch( SENSOR_1 )
  CloseSensor( SENSOR_1 )

end



% ======================================================
% ======================================================


%% Lab 3 Part B
% Moves robot until button is pressed
function lab3_b

  %% NXTMotor
  m = NXTMotor( [MOTOR_B; MOTOR_C] );
  m.SmoothStart = true;
  m.Power = 20;

  %% Open sensor
  OpenSwitch( SENSOR_1 )

  %% Start motor
  m.SendToNXT()

  %% Read sensor
  while true
    if GetSwitch( SENSOR_1 )
      m.Stop('off');
      break;
    end
    pause( 0.1 )
  end

end
```

```
% ======================================================
% ======================================================


%% Lab 4 Part A (1)
% Gets a reading from the color sensor in color mode
function lab4_a_1

  %% Get color sensor reading
  OpenNXT2Color( SENSOR_1, 'COLOR' )
  pause( 0.1 )
  c = GetNXT2Color( SENSOR_1 );
  disp( c )
  CloseSensor( SENSOR_1 )

end

% ======================================================
% ======================================================


%% Lab 4 Part A (2)
% Gets a reading from the color sensor in light mode
function lab4_a_2

  %% Get light sensor reading
  OpenNXT2Color( SENSOR_1, 'LIGHT' )
  pause( 0.1 )
  c = GetNXT2Color( SENSOR_1 );
  pause( 0.1 )
  disp( c )
  CloseSensor( SENSOR_1 )

end

% ======================================================
% ======================================================


%% Lab 4 Part B
% Uses the color sensor in color mode to follow a line
function lab4_b

  %% NXTMotor
  l_wheel = NXTMotor( MOTOR_B );
  r_wheel = NXTMotor( MOTOR_C );

  l_wheel.SmoothStart = true;
  r_wheel.SmoothStart = true;

  %% Open color sensor
```

```
  OpenNXT2Color( SENSOR_1, 'COLOR' )
  pause( 0.1 )

  %% Start right wheel
  r_wheel.Power = 20;
  r_wheel.SendToNXT()

  %% Follow line
  while true

    %% Right turn
    l_wheel.Power = 10;
    l_wheel.SendToNXT()
    % Wait until robot is over white area
    while ~strcmp( GetNXT2Color( SENSOR_1 ), 'WHITE' )
      pause( 0.01 )
    end

    %% Left turn
    l_wheel.Power = 40;
    l_wheel.SendToNXT()
    % Wait until robot is over black line
    while ~strcmp( GetNXT2Color( SENSOR_1 ), 'BLACK' )
      pause( 0.01 )
    end

  end

% ======================================================
% ======================================================


%% Lab 4 Part C
% Uses the color sensor in light mode to follow a line
function lab4_c

  %% NXTMotor
  l_wheel = NXTMotor( MOTOR_B );
  r_wheel = NXTMotor( MOTOR_C );

  l_wheel.SmoothStart = true;
  r_wheel.SmoothStart = true;

  %% Start color sensor
  OpenNXT2Color( SENSOR_1, 'LIGHT' )
  pause( 0.1 )

  %% Start right wheel
  r_wheel.Power = 20;
  r_wheel.SendToNXT()

  %% Follow line
  while true
```

```
    %% Set target reading
    target = 45;

    %% Adjust left wheel's speed based on sensor reading
    diff = target - GetNXT2Color( SENSOR_1 );
    % Floor is necessary because Power must be an integer
    l_wheel.Power = 20 - floor(diff);
    l_wheel.SendToNXT()
    pause( 0.01 )

  end

% ======================================================
% ======================================================


%% Lab 5 Part A (1)
% Collect readings from the ultrasonic sensor in continous mode
function lab5_a_1

  %% Get ultrasonic sensor readings
  OpenUltrasonic( SENSOR_1 )
  pause( 0.1 )

  for i=1:10
    disp( GetUltrasonic( SENSOR_1 ) )
    pause( 0.5 )
  end

end



% ======================================================
% ======================================================


%% Lab 5 Part A (2)
% Gets readings from the ultrasonic sensor in snapshot mode
function lab5_a_2

  %% Get sensor readings
  OpenUltrasonic( SENSOR_1, 'SNAPSHOT' )
  pause( 0.1 )

  for i=1:10
    USMakeSnapshot( SENSOR_1 )
    pause( 0.5 )
    echoes = USGetSnapshotResults( SENSOR_1 );
    disp( echoes )
  end

end
```

```
% ====================================================
% ====================================================


%% Lab 5 Part B
% Uses the ultrasonic sensor to maintain a given distance from a surface
function lab5_b( target )

  %% NXTMotor
  m = NXTMotor( [MOTOR_B; MOTOR_C] );
  m.SmoothStart = true;

  %% Open sensor
  OpenUltrasonic( SENSOR_1 )
  pause( 0.1 )

  %% Get sensor readings & adjust motors
  while true

    d = GetUltrasonic( SENSOR_1 );
    power = floor( ( d - target ) * 10 );
    %m.Power = power;
    m.Power = max( -100, min( 100, power ) );
    disp( m.Power )
    m.SendToNXT()
    pause( 0.1 )

  end

end
```