**ROB-GY 6103 Advanced Mechatronics: HW 5**

**Problem 1:** Use the Propeller Activity Board with its built-in LED on P26. Write a program with the use of high(), low(), and pause() commands that causes the LED on P26 to blink with an ON time of 200ms and an OFF time of 500 ms in an infinite loop. Next, modify the code to prompt a user to enter the ON and OFF times in ms through the SimpleIDE console. Use the user supplied values to update the blinking of LED on P26 accordingly.

**Problem 2:** Implement three versions of a program on the Propeller Activity Board to make the onboard LEDs (P26 and P27) blink at a frequency of 1Hz using the following approaches.

1. Using high() and low() functions
2. By directly manipulating the DIRA and OUTA registers
3. Using set_direction() and toggle() functions

**Problem 3:** Use the Propeller Activity Board with its built-in LED on P26 and P27. Write a program that causes to turn ON both LEDS for one second and the OFF for one second using port manipulation (DIRA and OUTA) in an infinite loop. Print the binary states of DIRA and OUTA after each change.

**Problem 4:** Interface two pushbuttons B1 and B2 with Propeller Activity Board pins P14 and P15 respectively (each button is setup in active HIGH configuration with a 220Ω resistor interfacing it to the Propeller pin (P14/P15) and a 10kΩ resistor to ground. Consider also the built-in LEDs on P26 and P27. Write a program that employs the toggle() function to the toggle the state of an LED each time the press of a corresponding button is sensed (e.g., using input() function). Button B1 on P14 controls the LED on P26 and Button P2 on P15 controls the LED on P27.

**Problem 5:** Connect a Parallax Standard Servo to one of the servo pin groups (P14—P19) on the Propeller Activity Board. Interface two push buttons to pins P0 (button B0) and P1 (button B1) using appropriate resistors. Write a program that:

1. rotates the servo clockwise by 10 degrees when BTN0 is pressed
2. counterclockwise by 10 degrees when BTN1 is pressed

Implement two versions of this program using (a) servo_set() function and (b) servo_angle() function.

**Problem 6:** Create an RC circuit using a 10kΩ potentiometer and a 0.1μF capacitor in parallel. Connect this circuit to a Propeller Activity Board with one end of this circuit connected to the GND pin and the other end to pin P7 through a 220Ω resistor. Write a program that prints the current potentiometer angle (in degrees) at one-second intervals by appropriately scaling the output from the rc_time() function.