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Microcontroller Techniques - Exercise Sheet 7

Topic: A Command Line Tool for MSP430 Configuration

WS 24/25

Name : Chandrika Sethumadhavan

Matriculation number : 5776354

Motivation

- Summary of the previous exercises
- Flexible integration
- Scalable design for adding sensors, actuators, or advanced functionalities.

Program flow

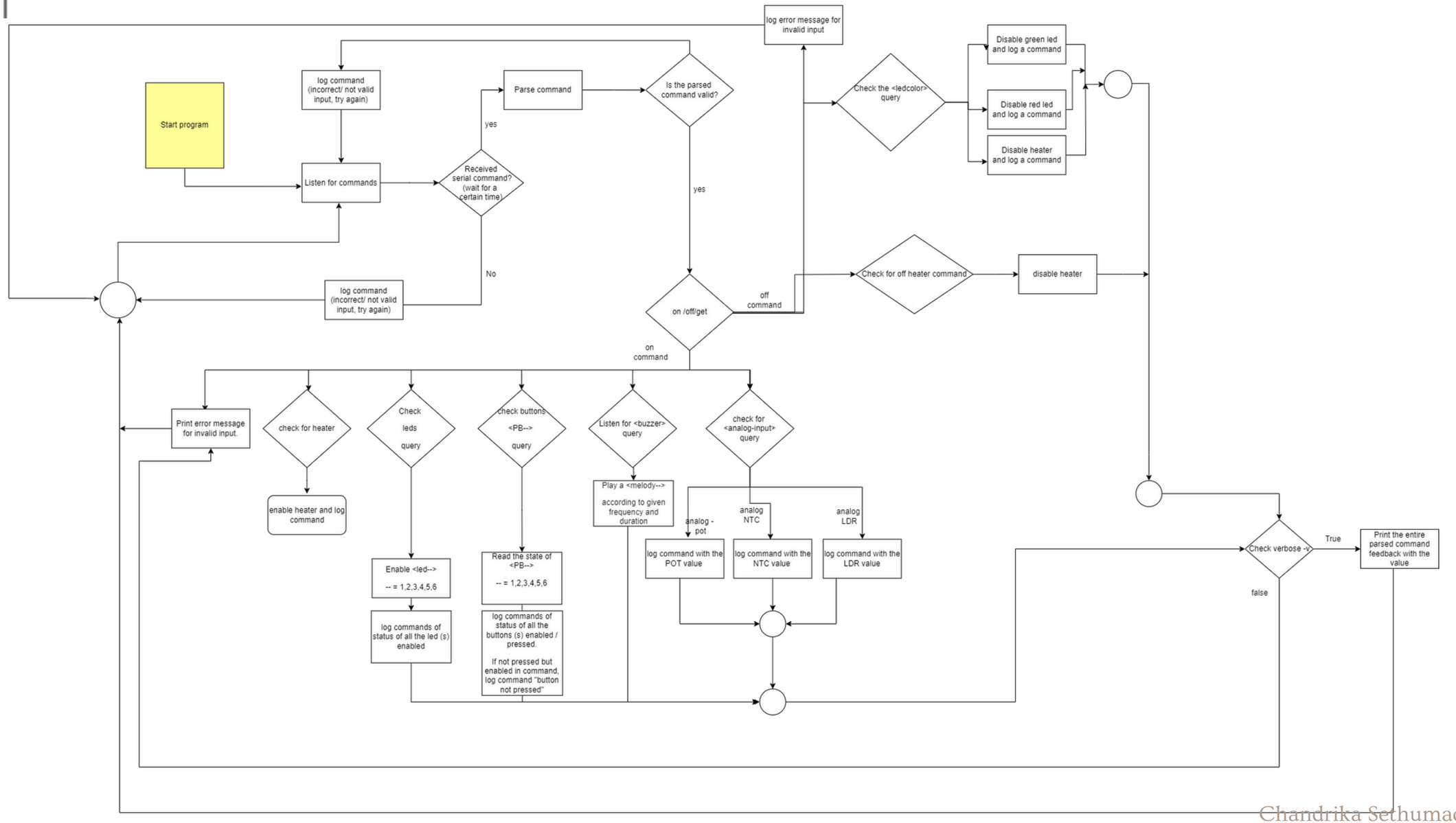
Step 1: Determine whether the command starts with "on" or "off" or “get”.

Step 2: Identify the component the command is addressing.

Step 3: Evaluate the verbose mode setting. Depending on this, the system will either output detailed text or display only the value associated with the command.

Step 4: Invalid commands are handled

- note: Slight changes in the main flow after the exercise sheet 6 feedback



Chandrika Sethumadhavan
5776354

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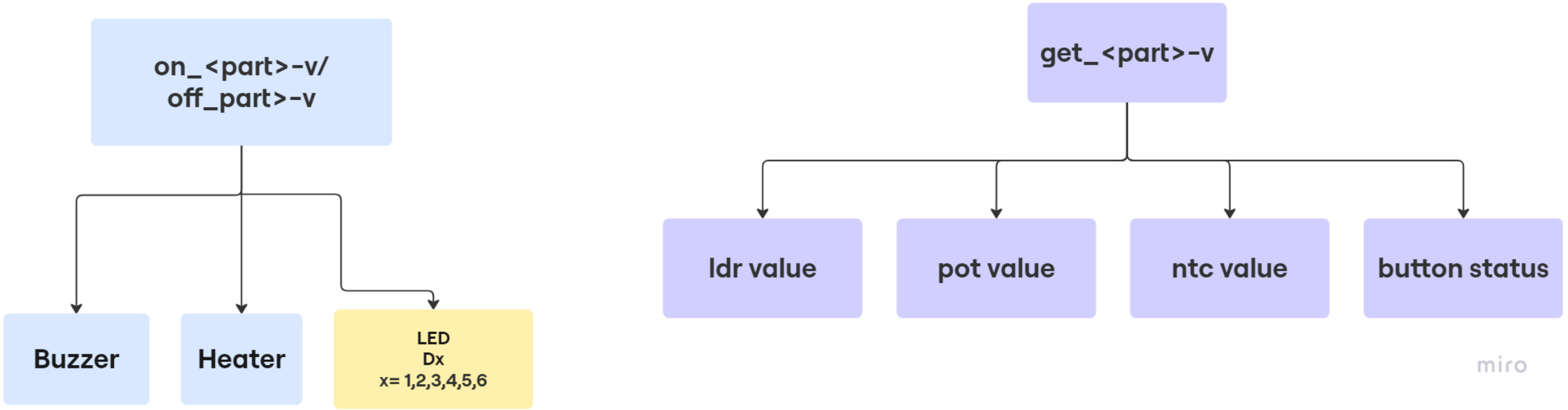
Pin connections

Buttons	pb5	PORT 3: P3.2
	pb6	PORT 3: P3.3
LDR	LDR-K2	PORT 1: P1.5
NTC	U_NTC	PORT 1: P1.6
Potentimeter	U_POT	PORT 1: P1.7
Heater	HEATER - X10	PORT 3 : P3.4
Buzzer	BUZZER - X1	PORT 3: P3.6
LEDs	LED rt - K3	PORT3: P3.1
	LED gn - K4	PORT 3: P3.0

Serial Commands - Overview



*for invalid commands: “this command is not valid, try again”

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Commands - for buttons

Command	What is checked?	What is the serial output?	Special feature
get_pb_pb1-v	checks if button pb1 is checked	If yes, prints “PB1 is pressed: Activating Knight Rider pattern.	Knight Rider pattern observed once at LEDs D1-4
get_pb_pb2-v	checks if button pb2 is checked	If yes, prints “PB2 is pressed: Flashing all LEDs”	LEDs D1-4 flashes 10 times
get_pb_pb3-v	checks if button pb3 is checked	If yes, “PB3 is pressed: Rotating LEDs.”	Rotating LEDs observed once at LEDs D1-4
get_pb_pb4-v	checks if button pb4 is checked	If yes “Turning on LEDs sequentially.”	LEDs D1-4 turns on sequentially once
get_pb_pb5-v	checks if button pb5 is checked	if yes “PB5 is pressed: Keeping all LEDs ON”	LEDs D1-4 are all on together
get_pb_pb6-v	checks if button pb6 is checked	if yes, “ PB6 is pressed: Alternating LEDs.”	LEDs D1-4 alternate 7 times

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Serial Commands - get

Command	What is the serial output?
get_u_pot-v	Fetching values Potentiometer Potentiometer The value is: ___
get_ntc-v	Fetching values ntc ntc The value is: ___
get_ldr-v	Fetching values ldr ldr The value is: ____

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5776354

Commands - for LEDs

on Command	Serial output?	off Command	Serial Output
on_led_d1-v	Turning on D1 led...	off_led_d1-v	Turning off D1 led...
on_led_d2-v	Turning on D2 led...	off_led_d2-v	Turning off D2 led...
on_led_d3-v	Turning on D3 led...	off_led_d3-v	Turning off D3 led...
on_led_d4-v	Turning on D4 led...	off_led_d4-v	Turning off D4 led...
on_led_d5-v	Turning on D5 led...	off_led_d5-v	Turning off D5 led...
on_led_d6-v	Turning on D6 led...	off_led_d6-v	Turning off D6 led...

Serial Commands - on

Commands	Serial output?	additional functionality
on_heater-v	Heater and blue LED are enabled	when heater is turned on, all LEDs from D1-4 also turns on
off_heater-v	Heater and blue LED are manually disabled	when heater is turned off, all LEDs from D1-4 also turns off
on_buzzer_<frequency>_<duration> example: on_buzzer_440_1000-v	Playing pre-defined melody (twinkle).	Custom frequency and duration

Description of additional special feature (s)

- Additional Light/LED show for each buttons pb1-pb6 with different led patterns. When PB1 is pressed, a Knight Rider pattern is activated, cycling through LEDs D1-D4 once. Pressing PB2 causes all LEDs (D1-D4) to flash 10 times. PB3 triggers a rotating LED sequence across D1-D4, while PB4 turns the LEDs on sequentially, one after the other. PB5 keeps all LEDs (D1-D4) illuminated simultaneously, and PB6 alternates the LEDs in a pattern repeated seven times. These features provide engaging visual feedback and distinct responses for each button interaction.

THANK YOU