

The Washing-Machine

Software project WS 21/22

Section I: General Requirements

The application should:

- Function as specified in Section II of this document.
- Conform to LabVIEW coding style and documentation standards
- Be hierarchical in nature. All major functions should be performed in subVIs.
- Be easily scalable to add more states / features without having to manually update the hierarchy.
- Minimize the use of excessive structures, variables (locals / globals) and Property Nodes.
- Respond to front panel controls (within 100 ms) and not utilize 100% of CPU time.
- Close all opened references and handles where used.

Be well documented and include the following:

- Labels on appropriate wires within the main VI and SubVIs.
- Descriptions for each algorithm.
- Documentation in VI Properties: Documentation for both main VI and SubVIs.
- Tip strip and Description for front panel controls and indicators.
- Labels for constants

Section II: Application Requirements

Task:

Your job is to design a washing machine using LabVIEW that satisfies all requirements listed below. Using the front panel which is provided, create a LabVIEW application that implements the actions of the procedure specified.

Requirements:

[REQ_01]: If the Power-Button is pressed (TRUE), the washing machine should be operational.

[REQ_02]: If the Power-Button is pressed again (FALSE), the LabVIEW program should stop.

[REQ_03]: The "program selector" should select the program the machine should perform.

[REQ_03.1]: Program 1: coloureds

[REQ_03.2]: Program 2: whites

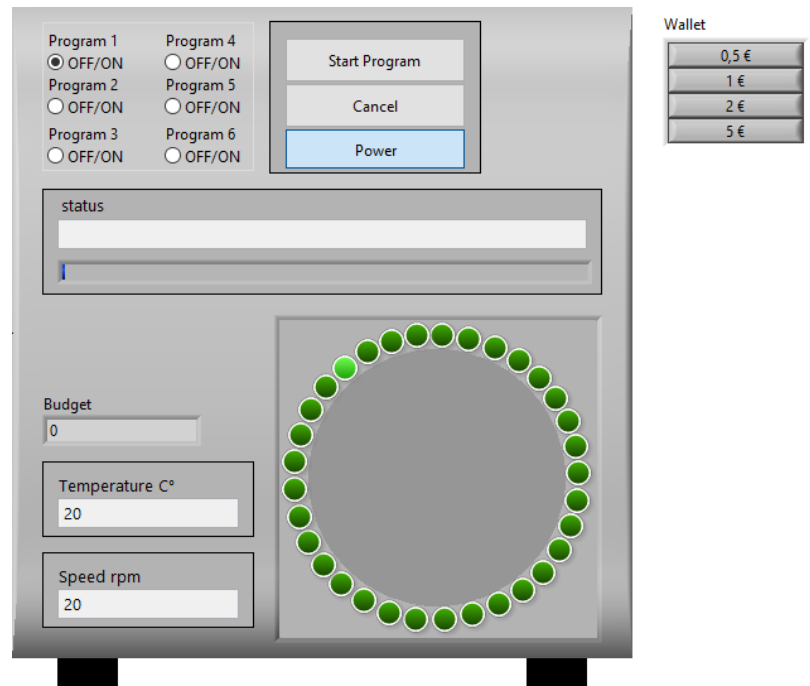
[REQ_03.3]: Program 3: dark

[REQ_03.4]: Program 4: coloureds - eco mode

[REQ_03.5]: Program 5: Express

[REQ_03.6]: Program 6: Maintenance

[REQ_04]: All Information about the selected program can be read out of the "Maintenance_programs.csv" file.



[REQ_04.1]: The duration for each washing step is specified in the file.

[REQ_04.2]: The temperature for each washing step is specified in the file.

[REQ_04.3]: The speed for each washing step is specified in the file.

[REQ_04.4]: The file is located in the maintenance folder of the project.

[REQ_04.5]: The prize for each program is stored in the csv file.

program1	Duration (s)	Temperature	Speed
Prewash	3	30	2
Main wash cycle	6	40	3
Spin cycle	3	-	5
program2	Duration (s)	Temperature	Speed
Prewash	2	40	3
Main wash cycle	5	60	4
Spin cycle	5	-	5
program3	Duration (s)	Temperature	Speed
Prewash	-	-	-
Main wash cycle	8	40	3
Spin cycle	4	-	4
program4	Duration (s)	Temperature	Speed
Prewash	-	-	-
Main wash cycle	10	30	3
Spin cycle	3	-	3
program5	Duration (s)	Temperature	Speed
Prewash	-	-	-
Main wash cycle	5	40	2
Spin cycle	3	-	5
program6	Duration (s)	Temperature	Speed
Prewash	5	50	2
Main wash cycle	5	75	4
Spin cycle	5	-	1

[REQ_05]: With the "Start Program Button" the machine executes the program.

[REQ_05.1]: The budget shall be updated according to the selected program.

[REQ_06]: The Temperature Indicator shows the current Temperature of the water inside the washing machine drum

[REQ_07]: The Speed indicator shows the speed of the washing machine drum.

[REQ_08]: The Process indicator shows the process of the washing program.

[REQ_09]: The status indicator shows the current status of the washing program.

[REQ_09.1]: Power Up machine: "Please select your program".

[REQ_09.2]: Prewash: " [Program title] - Prewash".

[REQ_09.3]: Main wash cycle: " [Program title] - Main wash cycle".

[REQ_09.4]: Spin cycle: " [Program title] - Spin cycle".

[REQ_09.5]: End: " [Program title] - End".

[REQ_09.6]: Error: „An Error occurred. Please call the support".

[REQ_09.7]: Program selection: „You selected [Program title]: [Price] ".

[REQ_09.8]: „Not enough money ".

[REQ_10]: The drum indicator shows the turning of the washing machine drum.

[REQ_10.1]: The speed number is in rounds per second.

[REQ_10.2]: According to the speed, the drum should run at different speed.

[REQ_11]: The wallet shall be used to insert money into the machine.

[REQ_11.1]: The budget display shall sum up the inserted coins.

[REQ_11.2]: With insufficient budget it shall not be possible to start the selected program.

[REQ_12]: The Cancel button shall cancel the program selection.

[REQ_12.1]: Inserted money shall be paid out.

[REQ_12.2]: Status shall display: "Selection canceled please take your money"

[REQ_12.3]: It shall not be possible to cancel the current washing process with the cancel button.

Keep in mind for Evaluation:

It is essential to hand in the written source code as well as a documentation. The project is evaluated according to the provided evaluation sheet.

Please keep in mind that copied source code (groups with identical code) will fail.