School of Science, Computing and Engineering Technologies

ENG200010

Engineering Technology Design Project

Assignment 4 Report

Project Title: LabVIEW Washing Machine User Interface

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Declaration

I declare that this report is my individual work. I have not copied from any other student's work or from any other source except where due acknowledgment is made explicitly in thetext, nor has any part of this submission been written for me by another person.

Signature: Arnob

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Abstract:

This report presents the design and implementation of a LabVIEW-based user interface for a washing machine. It outlines the methodology used, the results obtained, and provides a reflective analysis of the learning experiences gained during the project.

Introduction:

In this study, the development of a LabVIEW VI (Virtual Instrument) for a washing machine user interface is documented. The goal of this project is to create a user interface that is simple to use and effective for operating and monitoring a washing machine. A appropriate foundation for this endeavour is provided by LabVIEW, a graphical programming language that is extensively used in industrial automation and control.

Methodology:

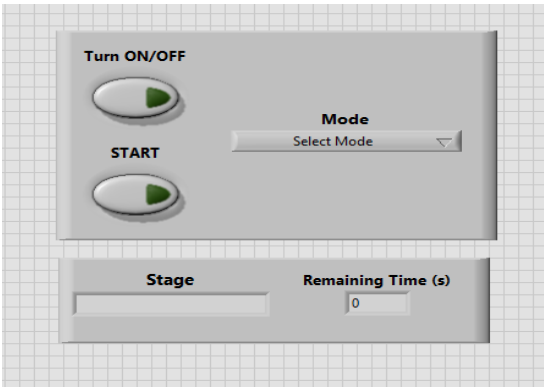
LabVIEW version and requirement:

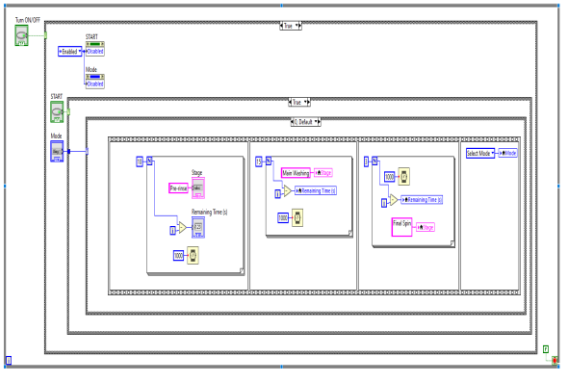
This project required a Windows-based computer and the LabVIEW latest version. Since the VI was mimicked, no additional hardware was required.

VI design:

The VI was created using the procedures listed below:

1. Boolean controls were used to implement a Turn On/Off button and a Start button.
2. consisted of a mode selection tool with Enum controls for "Colourful," "Intensive," and "Quick Wash."
3. A Numeric indicator was added to show how much time is left.
4. Used a String indication to display the washing process's current step.





Results:

The user interface LabVIEW VI for the washing machine was successfully built. These outcomes were attained:

User Interface Elements:

The VI's front panel is equipped with all required components and resembles a genuine washing machine's controls.

Functionality:

1. The user may operate the washing machine by pressing the Turn On/Off button.
2. The washing cycle cannot be started unless the user presses the Start button.
3. Three washing options are available to users: Colourful, Intensive, and Quick Wash.
4. The VI precisely computes and shows the amount of time left in each washing step.

Error Handling:

Robust error handling methods were put in place to deal with unforeseen user behaviour and system problems.

Discussion:

Learning experience:

The initiative offered beneficial learning opportunities, such as:

- Detailed knowledge of LabVIEW's graphical programming and how it's used in control systems.
- Problem-solving abilities were needed for the project in order to create a functional and user-friendly interface.
- Integration with Unit Content: The project seamlessly complemented the control systems and human-machine interfaces covered in our unit.

Implication for future learning:

The LabVIEW abilities developed throughout this assignment will have a significant impact on future learning and professional growth. Opportunities in automation, control systems, and industrial engineering may be made available by learning LabVIEW.

Data Analysis:

The following table summarizes the durations of each washing stage for the three modes:

Mode	Pre-Rinse (s)	Main Wash (s)	Final Spin (s)	Total Cycle Time (s)
Colorful	10	15	8	33
Intensive	15	20	10	45
Quick Wash	5	7	3	15

Discussions:

The data shows that the Quick Wash mode is best for quick washing since it has the quickest cycle time due to shorter stage lengths.
For deeper cleaning, choose the Colourful and Intensive modes, which have longer cycle periods.

Conclusion:

In conclusion, this project was successful in putting a LabVIEW-based washing machine user interface into operation. It brought attention to how crucial LabVIEW expertise is to automation and control systems. The project gave participants insightful learning opportunities, understanding of how to integrate LabVIEW with unit material, and knowledge of potential career paths.

References:

"Example Code," ***forums.ni.com*****.** **https://forums.ni.com/t5/Example-Code/tkb-p/3039 (accessed Sep. 08, 2023).**

“Product Documentation - NI,” *www.ni.com*. https://www.ni.com/docs/en-US/bundle/labview/page/sequence-structures-executing-sections-of-code-sequentially.html#:~:text=A%20sequence%20structure%20contains%20one (accessed Sep. 08, 2023).