ICS 4UI – Final PROJECT

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Report:

This project started and ended according to our plans. We started by deciding that the project will be a calculator mimicking the design of old calculators such as the sharp - el540. We soon split up the jobs and duties that were important in completing this assignment. The background calculations and order of operations was to be handled by Daniel while the user interface was to be handled by Ethan. The project was split up equally to ensure that coming together and merging both halves would be seamless and efficient while also on schedule. Throughout the main development phase, the project was made to work in halves or separate beta versions. Later, the halves were merged forming a final beta version. Within the merging process, the halves were interfaced and adaptations were made to incorporate new features. Before the two halves were combined it was evident that some sacrifices would be made to ensure the project was submitted on time. Some buttons (functions) were omitted to save on time. One major sacrifice was the parentheses buttons. Getting rid of these buttons would later result in limitations in the program that unfortunately wouldn't be resolved before the end of the semester. Lots of debugging occurred by both team members after the two halves of the project were combined. Once there was a basic version of the complete program it was time to elaborate on the beta design.

Some of the major fixes from the GUI end of the project includes spacing and setting up the buttons in an appropriate layout. At first the elements were laid out using their coordinate position by taking their location in a 2d array and scaling that to the limits of the window. This later caused problems with undefined button sizing that seemed unfixable, the solution was implementing a different layout. A combination of BoxLayout and GridLayout was used to organize the buttons and text fields. Panels were set up in either BoxLayout or GridLayout and nested into each other until the perfect layout was achieved. These layouts were very helpful and powerful to the project and ensured the elements were all accounted for and placed in an orderly fashion.

The backend portion of the calculator had a few issues throughout the project. After creating an equation stored as a string (created by the GUI), the string needed to be converted into operators and numbers. An issue occurred when dealing with decimal numbers since the same process for isolating an integer could not be used. Initially, a mathematical formula was used to loop to specific points in the decimal number to insert the number and loop back to the initial decimal position. This method worked perfectly fine but required a fair amount of time to develop. After implementation, a much more efficient solution was discovered, which was implemented for the use of immediate reaction buttons in method *addToMaster().* In the first technique, a single number was isolated from the string, changed into an integer, and then manipulated. In the solution for the new method, the single number was isolated but manipulated as a string before converting to a number. For the purposes needed, this was superior to the previous method. Since the original method worked fine and didn't require too much time to execute, it was kept the same.

The basics of the calculator were worked out. (numbers, basic operators… ect) It was then time to work on more complex and individual functions like the square root button. Group meetings occurred more often and there was a lot of drafting and planning for how we'd both like the features to work on the front end and behind the scenes. Once code was commented and the two halves worked seamlessly the project was done with as few limitations as possible in the time frame available.

Milestones/Goals:

Target Date	Milestone
START - June 5th	Want to have a good foundation and plan/layout for the project
June 5th - June 10th	Want to have a fully working skeleton of each half of the project
June 10th - June 17th	Want to combine both halves of the code so we can have a fully functional skeleton of the project
June 17th - June 20th	Clean up the code, add the last touches and make it presentation worthy. Test and do final debugging.

Task Log:

Name & Date	Task
Ethan - May 29th	Successfully created all the button with individual input routines.
Daniel - May 30th	Can manipulate string to isolate numbers and operators
Daniel - June 3rd	Can take a string such as “1+3” and calculate
Daniel - June 3rd	Can isolate decimals (done over the weekend, implemented on Monday)
Daniel - June 5th	Multiplication operation is working.
Ethan - June 6th	Original button making method scrapped for new gridlayout method.
Daniel - June 7th	Method for all basic operators is created
Ethan - June 10th	Successfully filled two panels with the buttons (in a grid layout) and a text field and placed them accordingly.
Danile - June 10th	Order of operations now works
Ethan - June 12th	Colour scheme is set up.
Daniel - June 12th	Organized methods for operations into a seperate class. This helped with code organization. Solidified proper order of operations
Ethan - June 14th	Can successfully send an equation and receive an answer to and from daniel's code to display on my end.
Group - June 19th	Finished up the final version of the project and submitted the assignment along with the rest of the documentation.

Task + Milestone Conclusion:

In conclusion, the milestones were met roughly when they were planned to be met with accuracy. Along with the planned general milestones the project was tweaked and bettered throughout the way. Due to time restrictions, some buttons don't work.

Critical Group Meetings:

Due to close proximity and constant communication, group meetings happened every day with multiple consultations daily. The team dynamic was interrupted.