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3 December 2023

CSE 165 Project Report

The program that we designed was a banking app using C++ and integrated into Qt Creator, which could be categorized as a "useful app." Upon starting up the program, the user has the option of creating one of three different types of banks: a normal bank, coin bank, and dollar bank. The normal bank can accept both dollars and coins, the coin bank can only accept coins, and the dollar bank can only accept dollars. Once the user selects a bank, they will be taken to the main screen, where they have the option to deposit and withdraw money. In the middle of the GUI is the transaction history, which records every change made to the bank. The left side of the screen has a list of the bank's contents, including the quantity of each dollar and coin type, how much the combined value of the dollar or coin type is worth, and the total balance of the bank. Finally, there is a button to delete the bank, which will delete all data from the bank and take the user back to the startup screen, where they can create a new bank of any of the aforementioned types.

John worked on the app's GUI, which integrated Qt, playing a vital role in the project. His work laid the foundation for the entire project. He worked on the withdrawal function. Kirath focused on the deposit function and also researched other GUI libraries we could have possibly implemented for the project alongside Javier. Javier was in charge of facilitating the version control, wireframing the GUI, and the check balance functionality. This allowed collaborators to work together remotely and asynchronously.

Internally, the banking app has four custom class types: Money, Bank, CoinBank, and DollarBank. Money serves as a form of conveniently storing information in Bank objects, such

as the name, value, and quantity of each dollar or coin type in the bank. Bank is the most important class of the program and is responsible for the majority of the app's functionalities. Located within the Bank class are several support functions, deposit, withdraw, and print. Deposit and withdraw have two variants, which are both overloaded functions. The first variant accepts one double value, which is directly added or subtracted from the balance, if applicable. The number of dollars and coins within the bank is automatically updated based on the amount added, where higher valued currency has a higher priority. The second variant accepts one double and one integer, and instead adds the integer times the value of the dollar or coin type that matches the double input. The bank's balance is updated based on the amount of dollars or coins added. Lastly, the print function displays all information about the bank, which is shown on the left side of the GUI. The deposit, withdraw, and print functions are all abstract functions that are overridden by their respective versions in CoinBank and DollarBank. CoinBank and DollarBank both inherit the majority of their functions from the Bank class, with appropriate changes made for each class. For instance, DollarBanks do not allow deposits or withdrawals of values less than $1, while both other types of banks do.

The banking app was originally written to be compatible with a C++ console, accepting user inputs with cin and outputting results using cout. Once the app was complete, it was later modified in order to display results to a Qt GUI through QTextEdit boxes. The inputs were primarily gathered from QLineEdit boxes, with QPushButtons being used to confirm many actions. Additionally, the use of QComboBoxes allowed users to select between creating bank types without needing to input a keyword or character. They were also used in choosing between the two deposit and withdrawal variants. Finally, many QLabels were placed throughout the GUI in order to label and provide definitions of the app's functionalities.