BSC – HGP - Assignment 01

Stock Trade Profit Calculator Specification

1 Assignment Information

Course	BSCO/BSCH
Stage/Year:	3
Module:	HCI & GUI Programming
Semester:	1
Assignment:	1
Date of Issue:	16/10/2024
Assignment Deadline:	2 weeks from issue date.
Assignment Weighting:	10% of Module
Assignment Submission:	Via Moodle Only

2 Introduction

In this assignment, you are required to develop a Stock Trade Profit Calculator application using Python and the PyQt6 library. This application will help the user determine if a profit or loss has been made on a specific stock over a selected time using historical stock market data.

Please Note: You will only be awarded marks for implementing the features requested.

2.1 Required Features (high-level)

The application must:

- Allow the user to select a specific stock (e.g., Amazon, Tesla, Microsoft, etc.).
- Allow the user to input the quantity of the stock purchased.
- Allow the user to select the purchase date.
- Display the total cost of the purchase.
- Allow the user to select the sell date.
- Display the total value at the time of sale.
- Display the profit or loss.
- Optional: Allow selection of multiple stocks for comparison.
- Optional: Display additional information (if you choose to add this feature.).

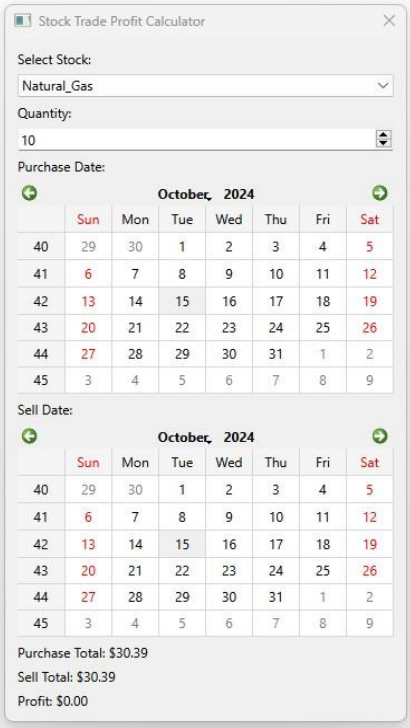

Figure 1. Basic GUI

Inspiration: The GUI for this application should be user-friendly and feature rich. You may reference the design of other financial calculators for inspiration but ensure to enhance the GUI based on your understanding of usability and UI principles.

Please Note: Additional Components Are Required.

2.2 Dataset

The application will use a CSV file containing historical stock market data. The dataset includes stock prices for a range of companies such as Amazon, Tesla, Microsoft, etc., across various dates. Ensure that your application reads and processes this dataset correctly to calculate profits and losses based on user inputs. It is recommended that you use the file(s) provided on Moodle to avoid confusion. Below is a sample of this file when viewed with a spreadsheet application.

	A	B	C	D	E	F	G	H	I	J	K
1	Date	Natural_G	Crude_oil	Copper	Bitcoin	Platinum	Ethereum	S&P_500	Nasdaq_1	Apple	Tesla
2	2/2/2024	2.079	72.28	3.8215	43,194.70	901.6	2,309.28	4,958.61	17,642.73	185.85	187.91
3	1/2/2024	2.05	73.82	3.8535	43,081.40	922.3	2,304.28	4,906.19	17,344.71	186.86	188.86
4	31-01-202	2.1	75.85	3.906	42,580.50	932.6	2,283.14	4,848.87	17,137.24	184.4	187.29
5	30-01-202	2.077	77.82	3.911	42,946.20	931.7	2,343.11	4,924.97	17,476.71	188.04	191.59
6	29-01-202	2.49	76.78	3.879	43,299.80	938.3	2,317.79	4,927.93	17,596.27	191.73	190.93
7	26-01-202	2.712	78.01	3.852	41,811.30	921.3	2,267.55	4,890.97	17,421.01	192.42	183.25
8	25-01-202	2.571	77.36	3.869	39,935.70	894.5	2,217.71	4,894.16	17,516.99	194.17	182.63
9	24-01-202	2.641	75.09	3.886	40,086.00	914.9	2,234.64	4,868.55	17,499.30	194.5	207.83
10	23-01-202	2.45	74.37	3.7935	39,888.80	905.5	2,243.74	4,864.60	17,404.21	195.18	209.14
11	22-01-202	2.419	75.19	3.7635	39,556.40	903	2,313.64	4,850.43	17,330.38	193.89	208.8
12	19-01-202	2.519	73.41	3.7865	41,648.00	907	2,491.81	4,839.81	17,314.01	191.56	212.19
13	18-01-202	2.697	74.08	3.745	41,292.70	912	2,469.77	4,780.94	16,982.29	188.63	211.88
14	17-01-202	2.87	72.56	3.733	42,768.70	889.6	2,531.26	4,739.21	16,736.28	182.68	215.55

Figure 2. US Stock Market Dataset CSV File

2.3 Resources to Assist You

The following examples will be of great assistance in completing this assignment

- **A Currency Converter GUI Program - PyQt5 Desktop Application Development Tutorial**
  - **GitHub:**
    https://github.com/DarBeck/PyQT5_Tutorial/blob/master/currency_converter.py
    - Keep in mind this example uses PyQt5, not PyQt6
  - **YouTube:**
    A Currency Converter GUI Program- Python PyQt5 Desktop Application Development Tutorial
    - https://www.youtube.com/watch?v=weKpTw1SjM4
- **PyQt Tutorials**
  - https://zetcode.com/pyqt6/
  - https://www.pythonguis.com/pyqt6/
- **Qt Documentation**
  - https://doc.qt.io/qt-6/qtwidgets-index.html
- **PyQt Documentation**
  - https://www.riverbankcomputing.com/static/Docs/PyQt6/api/qtwidgets/qtwidgets-module.html
- **Documenting Your code**
  - https://realpython.com/documenting-python-code/ (you can just use # and a good explanation!)

3. Submission Format

Submissions accepted via **MOODLE only** – submissions via email will not be accepted.

A single file with the following details

- **Compression format:** zip or rar.
- **Folder Name:** FirstName_LastName_StudentNumber_Ass1.
- **Required Folder Contents:**
  - Python script files or Jupyter Notebooks – use template provided.
  - Transformed_Stock_Market_Dataset.csv file containing the data to be used.
  - UI Design Document - use template provided, submit as PDF.
  - Any assets used for your application are to be included in a folder titled 'Assets'.

Important: All required files must be submitted in the format specified above. Failure to include all components will result in a 0 mark for the assignment.

4. Features (low-level), Marks and Penalties

The assignment is graded based on two main components: Application (70%) and Documentation (30%). Each component contains several features that will be evaluated on their presence, functionality, and design.

4.1 Application Structure (70%)

Feature	Feature#	Total Marks	Present	Functional	Well-Designed
Main Widget Selection	1	5	2	2	1
Stock Purchased Label and Selection Control	2	5	2	2	1
Quantity of Stock Purchased Label and Selection Control	3	5	2	2	1
Purchase Date Label and Selection Control	4	5	2	2	1
Purchase Total Label	5	5	2	2	1
Sell Date Label and Selection Control	6	5	2	2	1
Sell Total Labels	7	5	2	2	1
Profit/Loss Total Label	8	5	2	2	1
Additional Labels and Selection Controls (Optional)	9	30	12	12	6

Total Marks for Application: 70

4.2 Documentation (30%)

Feature	Feature#	Total Marks	Present	Functional	Well-Designed
Main Widget Selection	1	5	2	2	1
Stock Purchased Label and Selection Control	2	5	2	2	1
Quantity of Stock Purchased Label and Selection Control	3	5	2	2	1
Purchase Date Label and Selection Control	4	5	2	2	1

Total Marks for Documentation: 30

Figure 3. Assignment Marking Scheme

Each feature is awarded marks based on

- **Present:** if the feature is present in the application
- **Functional:** if the feature contributes to a well working app, higher marks will be awarded for customization of the function or attributes of the widget
- **Well Designed:** if the feature is incorporated well into the application obeying basic GUI design principles.

N.B. The elements should be clearly reported in the comments in your code and your "UI Design Document.doc" file

4.3 Penalties

Figure 4 documents the marks that will be deducted for various errors, so please read carefully.

Section	Marks Deduction	Error	Reason
Penalties	-30	Non executable code submitted.	Encourages student to buid robust code, reduces marking time.
	-20	Non standard libraries used, only standard SDK libraries should be used.	Ensures equal workload for all students. Reduces marking time by avoiding the requirement to install custom libraries for specific submissions.
	-10	Wrong compressed file format (only zip and rar allowed).	Encourages stdents to distribute resources in widely used formats. Reduces marking time as additional compression utilities do not need to be installed.
	-10	Wrong folder structure (see project introduction)	Encourages students to present work in a well structured format. Reduces marking time required to determine location and presence of component.

Figure 4. Errors - Deduction of Marks

4.4 Widgets to consider include the following:

- CheckBox
- QRadioButton
- QPushButton
- QTabWidget
- QTableWidget
- QScrollBar
- QProgressBar
- QDateTimeEdit
- QSlider
- QDial
- QGroupBox
- QCalendarWidget
- QLabel
- QDateEdit
- QComboBox

Further information on these widgets can be found here:
https://doc.qt.io/qt-6/gallery.html