**CMPT 305 Fall 2022: Midterm Exam/Assignment** **TableView and BarChart**
Due date: Nov 21 at 11:59 pm

*This is an individual assignment. You must develop and write your own solution.*

**Description** * have to handle the exception

Implement a compound interest calculator using JavaFX (see Fig. 1). The calculator should take the necessary information from the user: the principal ($), annual interest (%), compounding frequency (monthly, quarterly, semi-annually, or annually), and number of years. When the user clicks the Calculate button, the table view and bar chart should display the balance growth over the years (see a demo in the lecture on Nov 14). Format the table as shown (numbers in currency format, right aligned). Put the user interface elements carefully. Provide meaningful feedback if the user enters invalid values.

Use this formula to calculate a compound interest (https://en.wikipedia.org/wiki/Compound_interest):

$$I = P\left(1 + \frac{r}{n}\right)^{nt} - P$$

where: *I* is the interest
*P* is the initial principal
*r* is the annual interest rate
*n* is the compounding frequency: 12 (monthly), 4 (quarterly), 2 (semi-annually), or 1(annually)
*t* is the number of years

For example:

P = 1000, r = 5%, n = 1 (annually), t = 5 years

| Year | Opening Balance | Interest | Closing Balance | Interest calculation per year (t = 1) |
|---|---|---|---|---|
| 1 | 1,000.00 | 50.00 | 1,050.00 | 1000 * (1 + 0.05)^1 – 1000 = 50.00 |
| 2 | 1,050.00 | 52.50 | 1,102.50 | 1050 * (1 + 0.05)^1 – 1050 = 52.50 |
| 3 | 1,102.50 | 55.13 | 1,157.63 | … |
| 4 | 1,157.63 | 57.88 | 1,215.51 | … |
| 5 | 1,215.51 | 60.78 | 1,276.29 | 1215.51 * (1 + 0.05)^1 – 1215.51 = 60.78 |

P = 1000, r = 5%, n = 2 (semi-annually), t = 5 years

| Year | Opening Balance | Interest | Closing Balance | Interest calculation per year (t = 1) |
|---|---|---|---|---|
| 1 | 1,000.00 | 50.62 | 1,050.62 | 1000.00 * (1 + 0.025)^2 – 1000.00 = 50.62 |
| 2 | 1,050.62 | 53.19 | 1,103.81 | 1050.62 * (1 + 0.025)^2 – 1050.62 = 53.19 |
| 3 | 1,103.81 | 55.88 | 1,159.69 | … |
| 4 | 1,159.69 | 58.71 | 1,218.40 | … |
| 5 | 1,218.40 | 61.68 | 1,280.08 | 1218.40 * (1 + 0.025)^2 – 1218.40 = 61.68 |

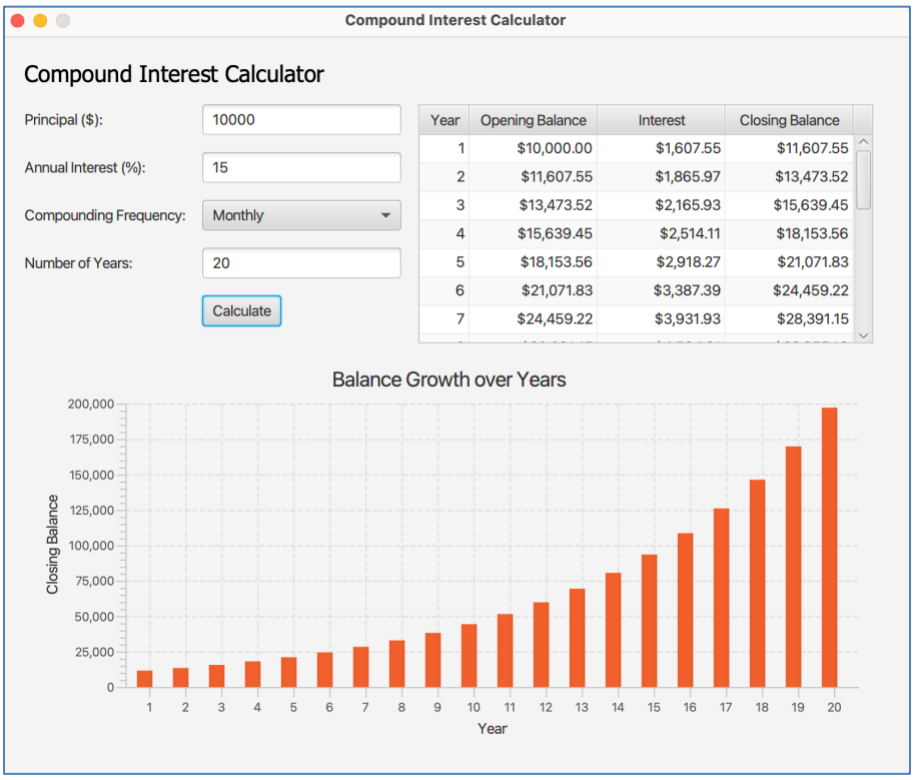


**Fig. 1: Compound interest calculator.**

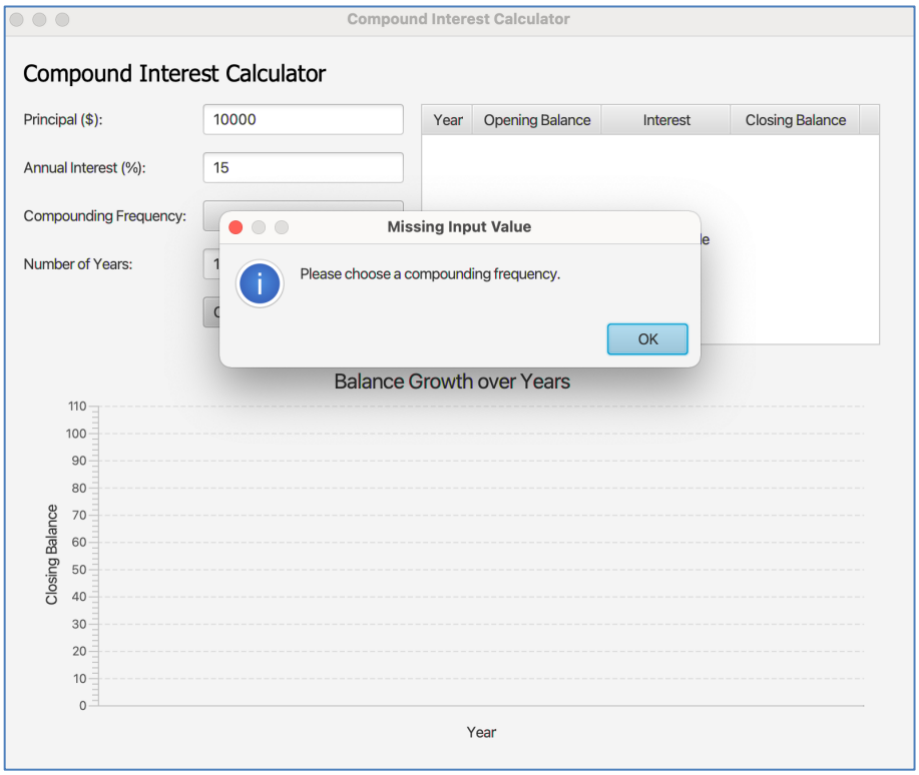


**Fig. 2: Provide meaningful error message.**

**Evaluation Criteria (Guidelines)**

Please also refer to the demo on Nov 14 to understand the requirements for this assignment. Should you have any questions, please ask for clarifications.

- 85 – 100: **All** required features (including the calculations) are **implemented correctly**, the user interface is **polished**, and the qualities of the code are **excellent** and **robust**.
- 75 – 84: **All** required features (including the calculations) are **implemented correctly**, and the user interface and qualities of the code are **good** with a few potential improvements.
- 65 – 74: **Most** of the required features are **implemented correctly**, and the user interface and qualities of the code are **good** with several potential improvements.
- 55 – 64: The calculations are correct, but only the table view or bar chart is implemented correctly.
- 45 – 54: The calculations are incorrect, and only the table view or bar chart is implemented correctly.
- 0 – 44: Both the table view and bar chart are not implemented correctly.

**Submission**

Submit your project folder (compressed) to mêskanâs before the due date.