Assignment 03 – Automatic Stock Trader

You must work in **alone** on this assignment. Do not use any Java language features we have not cover so far in this course.

Assignment Objectives
After completing this assignment the student should be able to:
- Write programs that make decisions
- Demonstrate the use of **if** statements in Java
- Use relational and logical operators to compute desired values

Assignment Requirements
For this assignment you are given the following files:

> **Assignment03.java**   (you must complete this file)

Problem Description and Given Info
Within the **main** method in the **Assignment03.java** file, you must design and write a program to determine whether to **buy**, **sell**, or **hold** shares in a stock market.

Your program must prompt the user to enter the 4 input values described below. It must collect the user's input and store these values in 4 different variables. It must collect the inputs in the order shown below.

Your program must determine whether the user should **buy**, **sell**, or **hold** their shares based on the input data. It must print out an appropriate message to the user. The output must be formatted exactly like the Expected output examples shown below.

Inputs

1. **Current Shares**   - This is the number of shares of this stock currently held in the account
2. **Purchase Price**   - (per share) paid for current stock in the account
3. **Market Price**   - (per share) of this stock. This is the current market price for buying or selling this stock
4. **Available Funds**   - the amount the client is willing to spend on a transaction

Outputs

1. Text containing the message to either buy, sell, or hold (see examples below)

Other Details

Any transaction (buy or sell) costs $10. Be sure to account for this transaction fee in your profitability calculations. We cannot buy or sell if we cannot pay this $10 fee. Note that this fee can be taken out of the profit from a sell (see below).

Each time we sell, it will cost us the $10 transaction fee.

Each time we buy, it will cost us the $10 transaction fee, plus the cost of the shares we are buying:

$$totalBuyCost = 10 + marketPrice \cdot numberOfSharesToBuy$$

The number of shares we can afford to buy would be:

$$numberOfSharesToBuy = FLOOR(\frac{availableFunds - transactionFee}{marketPrice})$$

In order for a purchase (buy) to be considered profitable, the current market price (per share) must be lower than the purchase price (per share) paid for current stock in the account. Additionally, the amount the client is willing to spend on a purchase must allow us to buy enough shares so that the difference in value will cover the $10 transaction fee.

In other words, if the current market price (per share) is lower than the purchase price (per share) paid for current stock

in the account, then there is a potential per share value that is equal to the price difference:

$$perShareBuyValue = purchasePrice - marketPrice$$

Assuming that we have the available funds to buy enough shares (and pay the $10 transaction fee), we should buy if the total value of the shares is greater than the $10 transaction fee. The total value of the shares is the per-share value times the number of shares we can afford to buy:

$$totalBuyValue = perShareBuyValue \cdot numberOfSharesToBuy$$

In order for a sale (sell) to be considered profitable, the current market price (per share) must be higher than the purchase price (per share) paid for current stock in the account. Additionally, the value gained by selling the shares must also cover the $10 transaction fee.

In other words, if the current market price (per share) is higher than the purchase price (per share) paid for current stock in the account, then there is a potential per share value that is equal to the price difference:

$$perShareSellValue = marketPrice - purchasePrice$$

In this case, we should see if we have enough shares of this stock so that the total value of the shares is greater than the $10 transaction fee. The total value of the shares is the per-share value times the number of shares we currently have:

$$totalSellValue = perShareSellValue \cdot currentShares$$

If neither a buy nor a sell would be profitable, then we should simply hold the existing shares.

Test Data

Test #1

Given Inputs

```
Current Shares  : 10
Purchase Price  : 100
Market Price    : 1
Available Funds : 10
```

Expected Output

```
Hold shares
```

Rationale: Even though the current market price is very low (compared to the purchase price), after paying the $10 transaction fee, we would not have any funds left to buy shares; so we can only hold.

Test #2

Given Inputs

```
Current Shares  : 20
Purchase Price  : 2
Market Price    : 1
Available Funds : 21
```

Expected Output

```
Buy 11 shares
```

Rationale: After paying the $10 transaction fee, there are enough funds remaining to buy 11 shares. At a purchase price vs. market price difference of $1 per share, our 11 shares represent a value gain of $11 dollars, which is $1 more than the $10 transaction fee - so we come out $1 ahead.

Test #3

Given Inputs

```
Current Shares  : 15
Purchase Price  : 12
Market Price    : 1
Available Funds : 12
```

Expected Output

```
Buy 2 shares
```

Rationale: After paying the $10 transaction fee, there are enough funds remaining to buy 2 shares. At a purchase price vs. market price difference of $11 per share, our 2 shares represent a value gain of $22 dollars, which is $12 more than the $10 transaction fee - so we come out $12 ahead.

Test #4

Given Inputs

```
Current Shares  : 1
Purchase Price  : 1
Market Price    : 11
Available Funds : 0
```

Expected Output

```
Hold shares
```

Rationale: Selling our 1 share for $11 will leave us with just $1 after we pay the $10 transaction fee. That is the same as what we paid for it, and we won't make any profit - so we should hold.

Test #5

Given Inputs

```
Current Shares  : 10
Purchase Price  : 1
Market Price    : 3
Available Funds : 30
```

Expected Output

```
Sell 10 shares
```

Rationale: With a market price vs. purchase price vs. difference of $2 per share, we stand to make $20 from the sale of our 10 shares. This is $10 more than the price of the transaction fee, so we will come out $10 ahead - therefore we should sell all 10 shares.

Test #6

Given Inputs

```
Current Shares  : 1
Purchase Price  : 1
Market Price    : 12
Available Funds : 0
```

Expected Output

```
Sell 1 shares
```

Rationale: Our 1 share is worth $11 more than we paid for it at the current market price. The $11 dollars obtained by selling that share now will still leave us with a profit of $1 after paying the $10 transaction fee. Profit is profit, so we should sell.

What to turn in
For this assignment you must upload the following files by the due date.

Assignment03.java

Any assignment submitted **less than 24 hours after the posted due date** will have **10 points deducted**.

Any assignment submitted **more than 24 hour after the posted due date** will receive **a zero in the grade book**.

Grading Rubric

Criteria	Points
All required files are submitted	10
Each file includes a comment header with the following information: • `CSE 110    : <Class #> / <meeting days and times>` • `Assignment  : <assignment #>` • `Author      : <name> & <studentID>` • `Description : <of the file contents>` • Partial credit can be awarded	
Code is neat and well organized	10
• Good naming conventions for all identifiers • Good use of whitespace • Descriptive comments • Partial credit can be awarded	
Code compiles with no syntax errors	20
• No Partial credit can be awarded • **No credit will be awarded for structure or logic if your code does not compile**	
Code passes structure tests	30
• Code collects 4 inputs • Code uses at least 2 **if** statements • Code outputs a results • Partial credit can be awarded	(10) (10) (10)
Code passes logic tests	30
• Partial credit is awarded based on number of tests passed • **No credit will be awarded for logic if your code does not pass all structure tests** • See test examples (#1 - #6) above in these instructions	
TOTAL	**100**