Coding Assignment 1

CSE 1325

Fall 2019

Create a pencil machine with the behaviors described below and as shown in the attached video.

Required elements

1. Pencil price must be a `define` and not hardcoded throughout the program. Changing the price of a pencil should only require changing the define and not anything else in the program.

2. Create a function to display any money amounts as a string containing $xx.yy where xx is the number of dollars and yy is the number of cents. Anywhere a money amount needs to be displayed by the program, this function must be called. C++ library function `to_string()` must be used.

3. Create a function to buy pencils. This function should

    a) Not print anything or accept anything (no `cin`s or `cout`s) – everything is passed in/passed back
    b) Check inventory level
    c) Check if exact payment was entered or not
    d) Check if enough change is already in the machine to give back change to the user. Money from the payment itself may not be used for providing change for the payment during the current transaction. For example, if the required payment is $6.00 and the user gives a payment of $10.00 and there is $2.00 of change in the machine, then the machine should not accept the payment since $4.00 of change is required and the machine only contains $2.00 of change. Payment amount should be added to change level after change has been given.
    e) Check if insufficient payment was given
    f) Decrement inventory level and increment change level as needed.
    g) This function will have a return type of boolean and a parameter that tells `main()` what happened/the **status** of the transaction

    If true is returned, then

    Pencils were sold and change was given **(status)**

    or

    Pencils were sold and exact payment was given and no change was needed **(status)**

    else false was returned

    not enough inventory to complete purchase **(status)**

    or

    not enough change was available to complete the purchase **(status)**

    or

    the provided payment was insufficient (no sale took place) **(status)**

or

something unknown happened **(status)**

The values returned in the status variable should be enumerated to make your program more readable. For example, set your status variable to an enumeration of `OK` rather than a value of `0`.

4. Create a function to handle the menu. Your menu should look like the menu in the video. It should print the menu and handle getting the user's input. The call to the menu function should be in a conditional loop in `main()` so that the program will keep running until the user chooses to exit.
5. The variables for tracking the inventory level and change level will be declared in `main()` and will be passed to your function to buy pencils. You will need to pass those by reference so that the increments/decrements made in your buy pencils function continue to exist outside of the function. To facilitate uniform testing for the GTAs, please initialize inventory level to 100 and change level to 500 (500 cents which is $5.00 – we will not use floats to represent money – we will be using the number of cents).
6. Create a switch statement in `main()` that acts upon the menu choice returned by your menu handling function.
7. Based on the status returned by your buy a pencil function, `main()` should print the messages to the user shown in the video.

Rubric

If program compiles with ANY warnings or errors, then a grade of 0 will automatically be assigned.

	Test	Points	Pass/Fail?
1	Student name and ID (10 digit student id) are at the top all files and C++ file is named `Code1_xxxxxxxxxx.cpp` where `xxxxxxxxxx` is the student id.	5	
2	Program is properly formatted – alignment and indention	10	
3	Change `define` for pencil price and recompile program. Does it recompile and does it function correctly?	5	
4	Money is displayed by calling one function throughout the program and the function utilizes `to_string`.	5	
5	A function displays the menu, accepts user input and returns the choice.	5	
6	Inventory level and change level variables are declared in `main()`.	5	
7	`main()` uses a `switch` statement to execute each menu option.	5	
8	The function to buy pencils has a return type of boolean and a parameter that tells `main()` the status of the transaction. The value of status has been enumerated.	5	
9	No `cin`s or `cout`s in the buy a pencil function.	4	
10	Execute 17 test cases. Each test case is worth 3 points.	51	

Test Cases

Test	Test Case Description	Expected Result
1	0 is entered for menu choice	program exits without any further printing or prompts
2	1 is entered for menu choice 3 pencils are requested for purchase Exact payment is given	Pencil purchase price is properly displayed as 3 times the pencil price. User is thanked for exact payment. Menu is redisplayed.
3	1 is entered for menu choice 3 pencils are requested for purchase Over payment not exceeding available change is given	Pencil purchase price is properly displayed as 3 times the pencil price. User is given the correct change. Menu is redisplayed.
4	1 is entered for menu choice 3 pencils are requested for purchase Over payment exceeding available change is given	Pencil purchase price is properly displayed as 3 times the pencil price. User is informed that the pencil machine does not have enough change and cannot accept the payment. Menu is redisplayed.
5	1 is entered for menu choice 3 pencils are requested for purchase Under payment of greater than 0 is given	Pencil purchase price is properly displayed as 3 times the pencil price. User is informed the payment was insufficient and pencils will not be dispensed. Menu is redisplayed.
6	1 is entered for menu choice 3 pencils are requested for purchase Under payment of 0 is given	Pencil purchase price is properly displayed as 3 times the pencil price. User is informed the payment was insufficient and pencils will not be dispensed. Menu is redisplayed.
7	1 is entered for menu choice 3 pencils are requested for purchase Under payment of less than 0 is given	Pencil purchase price is properly displayed as 3 times the pencil price. User is informed the payment was insufficient and pencils will not be dispensed. Menu is redisplayed.
8	2 is entered for menu choice	Inventory level is properly displayed. Option should be run before and after test case 2 to show proper inventory level decreases
9	3 is entered for menu choice	Change level is properly displayed. Option should be run before and after test case 2 to show proper change level increases.
10	9 is entered for menu choice	Invalid menu option message is displayed and menu is redisplayed.
11	1 is entered for menu choice -3 pencils are requested for purchase	User is told to purchase at least one pencil and the menu is redisplayed.
12	1 is entered for menu choice 0 pencils are requested for purchase	User is told to purchase at least one pencil and the menu is redisplayed.
13	1 is entered for menu choice 200 pencils are requested for purchase (inventory should start at 100)	User is told the machine does not have that many pencils and are told how many are available. Menu is redisplayed.
14	2 is entered for menu choice to retrieve current inventory level. 1 is entered for menu choice All pencils in inventory are purchased. 1 is entered for menu choice	After purchasing all available pencils, the second run of menu choice 1 should display a message stating that the pencil dispenser is out of pencils.
15	A letter is entered at the menu prompt	User is told that input must be numeric and is asked to reenter.
16	1 is entered for menu choice A letter is entered for the number of pencils to purchase	User is told that input must be numeric and is asked to reenter.
17	1 is entered for menu choice 3 pencils are requested for purchase A letter is entered for the payment.	User is told that input must be numeric and is asked to reenter.