Stamp Machine

Hissamuddin Shaikh

CSCI 201

18th May 2018

St. Cloud State University

**Stamp Machine**

**Problem Statement**:

Determine how many first-class stamps to dispense, and how many penny (one cent) stamps to dispense, based on the amount of money inserted into the vending machine.

**Input/Output Description:**

Input: The amount of money being inserted into the vending machine.

The registration of the client administrating a push on the “purchase” button.

Output: The number of first-class stamps released.

The amount of penny (one cent) stamps released.

**Variables:**

* *money\_inserted* 
  + Stores the information about the amount of money inserted into the vending machine.
* *money\_inserted\_in\_cents*
  + Stores the information about the money inserted, in cents.
* *first\_class\_stamps*
  + Stores the information about how many first-class stamps were purchased.
* *penny\_stamps*
  + Stores the information about how many penny stamps were purchased.

**Program Design:**

1. Prompt the user to enter the amount of money (in whole dollar bills) into the vending machine, and register them pressing the enter button, as the “Purchase” button.
2. Convert the dollar bill into cents, by multiplying the amount by a 100.
3. Calculate the number of first-class stamps to dispense by dividing the money (in cents) by 44, and the number of penny (one cent) stamps by determining the amount of the remaining money.
4. Display the information calculated above (in step 3), with appropriate descriptions outlining the information.

**Flowchart:**

A screenshot of text

Description generated with very high confidence

Figure. A

Note: “Perform Calculations” and “Display the amount of each stamp administered” are further explained below in Figure. B and Figure. C.

A screenshot of a cell phone

Description generated with high confidence

A close up of text on a white background

Description generated with very high confidenceFigure. B

Figure. C

**Algorithm Development (Detailed Pseudocode):**

* Input money into *money\_inserted* (with prompt).
* *money\_inserted\_in\_cents* = *money\_inserted* \* 100
* *first\_class\_stamps* = *money\_inserted\_in\_cents* / 44
* *penny\_stamps* = *money\_inserted\_in\_cents* % 44 (uses the remainder to determine the amount of penny (one cent) stamps).
* Display *first\_class\_stamps*.
* Display *penny\_stamps.*

**Program Listing:**

1. //Stamp Machine by Hissamuddin Shaikh
2. #include <iostream>
3. #include <cmath>
4. using namespace std;
5. int main()
6. {
7. //Define Variables
8. int money\_inserted;
9. int money\_inserted\_in\_cents;
10. int first\_class\_stamps;
11. int penny\_stamps;
12. //Prompt the user to enter the amount of money as whole dollar bills.
13. cout << "Type in the amount of money to be inserted into the vending machine (in whole dollar bills)." << endl << endl;
14. cin >> money\_inserted;
15. //Convert the dollar bills into their cents equivalent
16. money\_inserted\_in\_cents = money\_inserted \* 100;
17. //Calculate the amount of first class stamps that can be sold
18. first\_class\_stamps = money\_inserted\_in\_cents / 44;
19. //Calculate the amount of penny stamps that can be sold.
20. penny\_stamps = money\_inserted\_in\_cents % 44;
21. //Display the amount of first class stamps and penny stamps sold
22. cout << endl << "The amount of first class stamps dispensed:-" << first\_class\_stamps << endl << endl;
23. cout << "The amount of penny (one cent) stamps dispensed:-" << penny\_stamps << endl;
24. return 0;
25. }

**Sample test run of the program:**

1st Sample:

A screenshot of a computer screen

Description generated with very high confidence

2nd Sample:

A screenshot of a computer screen

Description generated with very high confidence

**Observations, error handling and general comments:**

The program runs correctly as the result in the 1st example and the 2nd example correspond to manual computations.

**1st example (Manual Computation) =**

1\*100 = 100

100/44 = 2 first class stamps

Remainder = 100 – (2\*44) = 12 penny (one cent) stamps

This is the same as the one computed by the computer.

**2nd example (Manual Computation) =**

5\*100 = 500

500/44 = 11 first class stamps

Remainder = 500 – (11\*44) = 16 penny (one cent) stamps

This is the same as the one computed by the computer.

No errors should be encountered if the user inputs a whole number, and no other form of data. Since we are simulating a stamp vending machine, and that it is stated to insert only whole dollar bills. Thus, it shouldn’t be a problem.

**Conclusions**

The Stamp Machine that has been constructed in this report should serve sufficiently and efficiently, with regards to calculating how many of each kind of stamp (penny or first class) to dispense, based on the amount of money entered.