

```
1  #include <iostream>
2  #include <stdio.h>
3  using namespace std;
4
5  //*****
6  //NEED TO TEST MORE
7  //*****
8
9  float newRand();
10
11 class CandyMachine {
12
13     private:
14         //member variables go here. All variables must be private.
15         int itemA = 5;
16         const int costA = 75;
17         int itemB = 3;
18         const int costB = 90;
19         int itemC = 5;
20         const int costC = 125;
21         int moneyEntered;
22         float storedMoney;
23     public:
24         CandyMachine();
25
26         // returns the value of the money in the machine in dollars as a float, such as
27         // 10.75 to represent ten dollars and 75 cents.
28         float getAmountStoredMoney();
29
30         // allows the user to add in money, in cents.
31         // to add a quarter, call addMoney(25);
32         void addMoney(unsigned int cents);
33
34         // each of these functions represents pushing the respective button.
35         // The user must have entered in sufficient money for the item.
36         // Prints out a message indicating success of purchase and the change the user receives
37         void pressAButton();
38         void pressBButton();
39         void pressCButton();
40
41         // prints out a message indicating the cost of each item in cents
42         void showCostA();
43         void showCostB();
44         void showCostC();
45
46         // returns the value of the number of each item. Does not print to screen.
47         int getAsRemaining();
48         int getBsRemaining();
49         int getCsRemaining();
50
51         // prints out a message indicating how much money, in cents, the user has entered.
52         void showMoneyEntered();
53
54         //A = Snickers = $0.75 = 5 to start
55         //B = Cookies = $0.90 = 3 to start
56         //C = Soda = $1.25 = 5 to start
57
58 };
59 //*****
60 //private functions
61 //*****
62 CandyMachine::CandyMachine(){
63     int moneyEntered = 0;
64     float storedMoney = 0.0;
65 }
66
```

```
67 float CandyMachine::getAmountStoredMoney(){
68     return storedMoney *0.01;
69 }
70 void CandyMachine::showMoneyEntered(){
71     cout << "You have entered " << moneyEntered << " cents." << endl;
72 }
73
74
75 void CandyMachine::addMoney(unsigned int cents){
76     moneyEntered += cents;
77 }
78
79
80 void CandyMachine::pressAButton(){
81     if(itemA != 0){ //is the item in stock?
82         if (moneyEntered < costA){ //not enough money
83             cout << "You need to add an additional " << costA - moneyEntered;
84             cout << " cents." << endl;
85         }
86         else if (moneyEntered > costA){ //too much money
87             cout << "Wise Choice. Recieve Item A";
88             cout << " and your " << moneyEntered - costA << " cents change below.";
89             cout << endl;
90             storedMoney+=costA;
91             moneyEntered = 0;
92             itemA--;
93         }
94         else{//if the same amount
95             cout << "Wise Choice. Recieve Item A below." << endl;
96             storedMoney+=costA;
97             moneyEntered = 0;
98             itemA--;
99         }
100     }
101     else{ //not in stock
102         cout << "Sorry, that item is out. Please choose another." << endl;
103     }
104 }
105 void CandyMachine::pressBButton(){
106     if(itemB != 0){ //is the item in stock?
107         if (moneyEntered < costB){ //not enough money
108             cout << "You need to add an additional " << costB - moneyEntered;
109             cout << " cents." << endl;
110         }
111         else if (moneyEntered > costB){ //too much money
112             cout << "Wise Choice. Recieve Item B";
113             cout << " and your " << moneyEntered - costB << " cents change below.";
114             cout << endl;
115             storedMoney+=costB;
116             moneyEntered = 0;
117             itemB--;
118         }
119         else{//if the same amount
120             cout << "Wise Choice. Recieve Item B below." << endl;
121             storedMoney+=costB;
122             moneyEntered = 0;
123             itemB--;
124         }
125     }
126     else{//not in stock
127         cout << "Sorry, that item is out. Please choose another." << endl;
128     }
129 }
130 void CandyMachine::pressCButton(){
131     if(itemC != 0){ //is the item in stock?
132         if (moneyEntered < costC){ //not enough money
133             cout << "You need to add an additional " << costC - moneyEntered;
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134         cout << " cents." << endl;
135     }
136     else if (moneyEntered > costC){//too much money
137         cout << "Wise Choice. Recieve Item C";
138         cout << " and your " << moneyEntered - costC << " cents change below.";
139         storedMoney+=costC;
140         cout << endl;
141         moneyEntered = 0;
142         itemC--;
143     }
144     else{//if the same amount
145         cout << "Wise Choice. Recieve Item C below." << endl;
146         storedMoney+=costC;
147         moneyEntered = 0;
148         itemC--;
149     }
150 }
151 else{//not in stock
152     cout << "Sorry, that item is out. Please choose another." << endl;
153 }
154 }
155
156
157
158 void CandyMachine::showCostA(){
159     cout << "Item A costs " << costA << " cents." << endl;
160 }
161 void CandyMachine::showCostB(){
162     cout << "Item B costs " << costB << " cents." << endl;
163 }
164 void CandyMachine::showCostC(){
165     cout << "Item C costs " << costC << " cents." << endl;
166 }
167 int CandyMachine::getAsRemaining(){
168     return itemA;
169 }
170 int CandyMachine::getBsRemaining(){
171     return itemB;
172 }
173 int CandyMachine::getCsRemaining(){
174     return itemC;
175 }
176 //*****
177 //simple Main from the handout example
178 //output should match handout character by character
179 //*****
180 /*
181 int main() {
182
183     CandyMachine* machine = new CandyMachine();
184
185     machine->addMoney(25);
186     machine->addMoney(10);
187     machine->addMoney(25);
188     machine->showMoneyEntered();
189     machine->addMoney(50);
190     machine->pressAButton();
191     machine->showCostA();
192
193     printf("Machine contains $%.2f.\n", machine->getAmountStoredMoney());
194
195     machine->addMoney(50);
196     machine->pressAButton();
197     machine->addMoney(105);
198     machine->pressAButton();
199     machine->pressAButton();
200     machine->pressAButton();

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201     machine->addMoney(125);
202     machine->pressBButton();
203
204     printf("Machine contains $%.2f.\n", machine->getAmountStoredMoney());
205     cout << "There are " << machine->getAsRemaining() << " A's left." << endl;
206
207     machine->addMoney(75);
208     machine->pressAButton();
209
210     cout << "There are " << machine->getAsRemaining() << " A's left." << endl;
211
212     machine->addMoney(85);
213     machine->pressAButton();
214
215     machine->addMoney(90);
216     machine->pressAButton();
217
218     machine->addMoney(95);
219     machine->pressAButton();
220     machine->pressBButton();
221
222 }
223 */
224 //*****
225 // Use THIS main() in order to comprehensively test
226 // your class. Include its output in your solution
227 //*****
228
229 int main() {
230
231     CandyMachine* machine1 = new CandyMachine();
232     CandyMachine* machine2 = new CandyMachine();
233     CandyMachine* machine3 = new CandyMachine();
234
235     for (int i=0; i<8; i++) {
236         machine1->addMoney(newRand()*150);
237         machine2->addMoney(newRand()*100);
238         machine3->addMoney(newRand()*50);
239         machine3->addMoney(newRand()*50);
240
241         machine1->showMoneyEntered();
242         machine2->showMoneyEntered();
243         machine3->showMoneyEntered();
244
245         machine1->pressAButton();
246         machine2->pressBButton();
247         machine3->pressCButton();
248         cout << endl;
249     }
250
251     machine1->addMoney(200);
252     machine2->addMoney(200);
253     machine3->addMoney(200);
254
255     machine1->showMoneyEntered();
256     machine2->showMoneyEntered();
257     machine3->showMoneyEntered();
258     cout << endl;
259
260     machine1->pressCButton();
261     machine2->pressAButton();
262     machine3->pressBButton();
263
264     machine1->addMoney(90);
265     machine2->addMoney(75);
266     machine3->addMoney(125);
267 }
```

```

268     machine1->pressBButton();
269     machine2->pressAButton();
270     machine3->pressCButton();
271
272
273     printf("\nMachine 1 contains $%.2f\n", machine1->getAmountStoredMoney());
274     cout << "There are " << machine1->getAsRemaining() << " A's left in Machine 1." << endl;
275
276     printf("Machine 2 contains $%.2f\n", machine2->getAmountStoredMoney());
277     cout << "There are " << machine2->getCsRemaining() << " C's left in Machine 2." << endl;
278
279     printf("Machine 3 contains $%.2f\n", machine3->getAmountStoredMoney());
280     cout << "There are " << machine3->getCsRemaining() << " C's left in Machine 3." << endl << endl;
281
282     for (int i=0; i<5; i++) {
283         machine1->addMoney(newRand()*50);
284         machine2->addMoney(newRand()*200);
285         machine1->addMoney(newRand()*150);
286         machine3->addMoney(newRand()*50);
287         machine1->pressBButton();
288         machine2->pressCButton();
289         machine3->pressCButton();
290         cout << endl;
291     }
292
293     machine1->showCostA();
294     machine2->showCostB();
295     machine3->showCostC();
296     cout << endl;
297
298
299     cout << endl << "final tally: " << endl;
300     cout << "Machine 1:" << endl;
301     printf("%d\t%d\t%d\t%.2f\n", machine1->getAsRemaining(),machine1->getBsRemaining(),machine1->getCsRemaining(),machine1->getAmountSt
302
303     cout << "Machine 2:" << endl;
304     printf("%d\t%d\t%d\t%.2f\n", machine2->getAsRemaining(),machine2->getBsRemaining(),machine2->getCsRemaining(),machine2->getAmountSt
305
306     cout << "Machine 3:" << endl;
307     printf("%d\t%d\t%d\t%.2f\n", machine3->getAsRemaining(),machine3->getBsRemaining(),machine3->getCsRemaining(),machine3->getAmount
308
309
310
311 }
312 float newRand()
313 {
314     static unsigned short lfsr = 0xACE1u;
315     unsigned bit;
316
317     bit = ((lfsr >> 0) ^ (lfsr >> 2) ^ (lfsr >> 3) ^ (lfsr >> 5) ) & 1;
318     lfsr = ( lfsr >> 1) | (bit << 15));
319     return (float)lfsr/65536;
320 }
321
322
323 //*****
324 // SIMPLE OUTPUT
325 //*****
326 /*
327 $ a.exe
328 You have entered 60 cents.
329 Wise Choice. Recieve Item A and your 35 cents change below.
330 Item A costs 75 cents.
331 Machine contains $0.75.
332 You need to add an additional 25 cents.
333 Wise Choice. Recieve Item A and your 80 cents change below.
334 You need to add an additional 75 cents.

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335 You need to add an additional 75 cents.
336 Wise Choice. Recieve Item B and your 35 cents change below.
337 Machine contains $2.40.
338 There are 3 A's left.
339 Wise Choice. Recieve Item A below.
340 There are 2 A's left.
341 Wise Choice. Recieve Item A and your 10 cents change below.
342 Wise Choice. Recieve Item A and your 15 cents change below.
343 Sorry, that item is out. Please choose another.
344 Wise Choice. Recieve Item B and your 5 cents change below.
345 */
346 //*****
347 // COMPREHENSIVE OUTPUT
348 //*****
349 /*
350 $ a.exe
351 You have entered 50 cents.
352 You have entered 66 cents.
353 You have entered 16020940 cents.
354 You need to add an additional 25 cents.
355 You need to add an additional 24 cents.
356 Wise Choice. Recieve Item C and your 16020815 cents change below.
357
358 You have entered 62 cents.
359 You have entered 120 cents.
360 You have entered 19 cents.
361 You need to add an additional 13 cents.
362 Wise Choice. Recieve Item B and your 30 cents change below.
363 You need to add an additional 106 cents.
364
365 You have entered 147 cents.
366 You have entered 78 cents.
367 You have entered 85 cents.
368 Wise Choice. Recieve Item A and your 72 cents change below.
369 You need to add an additional 12 cents.
370 You need to add an additional 40 cents.
371
372 You have entered 33 cents.
373 You have entered 89 cents.
374 You have entered 125 cents.
375 You need to add an additional 42 cents.
376 You need to add an additional 1 cents.
377 Wise Choice. Recieve Item C below.
378
379 You have entered 128 cents.
380 You have entered 170 cents.
381 You have entered 67 cents.
382 Wise Choice. Recieve Item A and your 53 cents change below.
383 Wise Choice. Recieve Item B and your 80 cents change below.
384 You need to add an additional 58 cents.
385
386 You have entered 109 cents.
387 You have entered 86 cents.
388 You have entered 98 cents.
389 Wise Choice. Recieve Item A and your 34 cents change below.
390 You need to add an additional 4 cents.
391 You need to add an additional 27 cents.
392
393 You have entered 16 cents.
394 You have entered 91 cents.
395 You have entered 137 cents.
396 You need to add an additional 59 cents.
397 Wise Choice. Recieve Item B and your 1 cents change below.
398 Wise Choice. Recieve Item C and your 12 cents change below.
399
400 You have entered 35 cents.
401 You have entered 6 cents.
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```
402 You have entered 64 cents.
403 You need to add an additional 40 cents.
404 Sorry, that item is out. Please choose another.
405 You need to add an additional 61 cents.
406
407 You have entered 235 cents.
408 You have entered 206 cents.
409 You have entered 264 cents.
410
411 Wise Choice. Recieve Item C and your 110 cents change below.
412 Wise Choice. Recieve Item A and your 131 cents change below.
413 Wise Choice. Recieve Item B and your 174 cents change below.
414 Wise Choice. Recieve Item B below.
415 Wise Choice. Recieve Item A below.
416 Wise Choice. Recieve Item C below.
417
418 Machine 1 contains $4.40
419 There are 2 A's left in Machine 1.
420 Machine 2 contains $4.20
421 There are 5 C's left in Machine 2.
422 Machine 3 contains $5.90
423 There are 1 C's left in Machine 3.
424
425 Wise Choice. Recieve Item B and your 62 cents change below.
426 You need to add an additional 37 cents.
427 You need to add an additional 82 cents.
428
429 You need to add an additional 10 cents.
430 Wise Choice. Recieve Item C and your 56 cents change below.
431 You need to add an additional 52 cents.
432
433 Wise Choice. Recieve Item B and your 97 cents change below.
434 Wise Choice. Recieve Item C and your 55 cents change below.
435 You need to add an additional 41 cents.
436
437 Sorry, that item is out. Please choose another.
438 You need to add an additional 14 cents.
439 Wise Choice. Recieve Item C and your 3 cents change below.
440
441 Sorry, that item is out. Please choose another.
442 Wise Choice. Recieve Item C and your 80 cents change below.
443 Sorry, that item is out. Please choose another.
444
445 Item A costs 75 cents.
446 Item B costs 90 cents.
447 Item C costs 125 cents.
448
449
450 final tally:
451 Machine 1:
452 2      0      4      6.20
453 Machine 2:
454 3      0      2      7.95
455 Machine 3:
456 5      2      0      7.15
457 */
```