

```

1 import javax.swing.JOptionPane;
2 import java.text.DecimalFormat;
3 import java.text.NumberFormat;
4 import java.util.Random;
5
6 /**
7  * A class that imitates a simple phone.
8  *
9  * This send/receives texts, streams audio, and charges
10 * as well as keeping track of data usage.
11 * It will print a monthly statement with all of the statistics and
12 * bills for the phone.
13 * <br>
14 * Example code:<br>
15 * {@code MyPhone phone = new MyPhone("John Doe", "0102030405");}<br>
16 * {@code phone.chargeBattery(50);}<br>
17 * {@code phone.streamAudio(100);}<br>
18 * {@code phone.sendText("Hello");}<br>
19 * {@code phone.readText();}<br>
20 * {@code phone.printStatement();}<br>
21 *
22 * @author Silas Agnew
23 * @version 1.0.0
24 */
25 public class MyPhone
26 {
27     private static final String DEFAULT_NUMBER = "9999999999";
28     private static final double DATA_PER_MIN = 65 / 60.0;
29     private static final double MAX_MINUTES = 720.0;
30
31     private int textCount;
32     private double dataConsumed;
33     private double batteryLevel;
34     private String name;
35     private String number;
36
37     //-Constructors-----//
38
39     /**
40      * Constructs a phone
41      * @param name Name of the phone user
42      * @param number Phone number (must be all digits with a length of 10)
43      */
44     public MyPhone(String name, String number)
45     {
46         textCount = 0;
47         dataConsumed = 0.0;
48         batteryLevel = 0.0;
49         setName(name);
50         setPhoneNumber(number);
51     }
52
53     //-Accessors-----//
54
55     /**
56      * @return Number of texts sent or received

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57     */
58     public int getNumTexts() { return textCount; }
59
60     /**
61      * @return Percentage of battery life remaining
62      */
63     public double getBatteryLife() { return batteryLevel; }
64
65     /**
66      * @return Amount of data used in MB
67      */
68     public double getDataUsage() { return dataConsumed; }
69
70     //-Mutators-----//
71
72     /**
73      * @param name Name to set {@code MyPhone.name} to
74      */
75     public void setName(String name) { this.name = name; }
76
77     /**
78      * Sets the phone number, if valid, to {@code number}.
79      * If the number is invalid it will set the phone number to
80      * {@code DEFAULT_NUMBER} (9999999999)
81      * @param number The phone number to set. Should be exactly 10 characters
82      *               of only digits
83      * @return if the passed in string was valid
84      */
85     public boolean setPhoneNumber(String number)
86     {
87         if (number.length() == 10)
88         {
89             this.number = number;
90             return true;
91         }
92         else this.number = DEFAULT_NUMBER;
93         return false;
94     }
95
96     /**
97      * Charges the battery for the value that is equivalent to
98      * charging it for time: {@code mins}
99      * A full charge is 120 minutes so percentage of charge added is
100     * found from {@code mins}/120
101     * @param mins Metaphorical minutes to charge for
102     */
103     public void chargeBattery(int mins)
104     {
105         if (mins <= 0) return;
106         batteryLevel = mins / 120.0 <= 1 - batteryLevel ?
107             batteryLevel + mins / 120.0 : 1;
108
109         JOptionPane.showMessageDialog(
110             null, "Battery Level: " + (int)(batteryLevel * 100) + "%");
111     }
112

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113  /**
114   * Simulates streaming audio
115   * This dissipates the battery and will kill the battery
116   * if the streaming is for longer than the battery allows
117   * @param mins Minutes to stream audio
118   */
119  public void streamAudio(int mins)
120  {
121      if (Double.compare(batteryLevel, 0) <= 0) return;
122      double minutes = 0;
123      if (Double.compare((double)mins, MAX_MINUTES * batteryLevel) > 0)
124      {
125          minutes = MAX_MINUTES * batteryLevel;
126          JOptionPane.showMessageDialog(
127              null, "Warning: MyPhone runs out of battery after "
128                  + minutes + " minutes");
129      }
130      else minutes = mins;
131
132      batteryLevel -= minutes / MAX_MINUTES;
133      dataConsumed += minutes * DATA_PER_MIN;
134  }
135
136  /**
137   * Simulates sending a text and shows the sent text in a popup message
138   * @param text Text to send
139   */
140  public void sendText(String text)
141  {
142      if (batteryLevel < 0.0001) return;
143      textCount++;
144      JOptionPane.showMessageDialog(null, "You: " + text);
145  }
146
147  /**
148   * Receives a text
149   * The text is randomly generated and displayed in a popup message
150   */
151  public void readText()
152  {
153      if (batteryLevel < 0.0001) return;
154
155      Random rnd = new Random();
156      int length = rnd.nextInt(4) + 25;
157      char gen[] = new char[length];
158      String text;
159
160      for (int i = 0; i < length; i++)
161      {
162          gen[i] = (char)(rnd.nextInt(96) + 32);
163      }
164      text = new String(gen);
165
166      switch (rnd.nextInt(5))
167      {
168          case 0:

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169         text += " Oh sry wrong person";
170         break;
171     case 1:
172         text += " Who dis?";
173         break;
174     case 2:
175         text += " K.";
176         break;
177     case 3:
178         text += " Why are you texting me?";
179         break;
180     case 4:
181         text += " Wat?";
182         break;
183     }
184
185     textCount++;
186     JOptionPane.showMessageDialog(null, "Rando: " + text);
187 }
188
189 /**
190  * Prints out the monthly statement for the phone
191  * This includes the customer info and usage stats as well as
192  * the monthly bill
193  * NOTE: Renews the month at the end of the call
194  */
195 public void printStatement()
196 {
197     NumberFormat fmt = NumberFormat.getCurrencyInstance();
198     DecimalFormat dfmt = new DecimalFormat("#.##");
199
200     System.out.println("MyPhone Monthly Statement\n");
201
202     System.out.println("Customer: " + name);
203     System.out.println("Number: " + fmtPhoneNumber());
204     System.out.println("Texts: " + textCount);
205     System.out.println("Data usage: " +
206         dfmt.format(dataConsumed / 1000) + " (GB)\n");
207
208     System.out.println("2GB Plan: " + fmt.format(50));
209     System.out.println("Additional data fee: " +
210         fmt.format(calcAdditionalDataFee()));
211     System.out.println("Universal Usage (3%): " +
212         fmt.format(calcUsageCharge()));
213     System.out.println("Administrative Fee: " + fmt.format(0.61));
214     System.out.println("Total Charges: " + fmt.format(calcTotalFee()));
215
216     startNewMonth();
217 }
218
219 //-Helpers-----//
220
221 /**
222  * Resets usage data for a new measurement period
223  */
224 private void startNewMonth()

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```
225     {
226         dataConsumed = 0.0;
227         textCount = 0;
228     }
229
230     /**
231      * @return Fee for over-use data in dollars
232      */
233     private double calcAdditionalDataFee()
234     {
235         double addDataUsedGB = dataConsumed / 1000 - 2;
236         return addDataUsedGB < 0.0001 ? 0 : Math.ceil(addDataUsedGB) * 15;
237     }
238
239     /**
240      * @return The usage charge in dollars
241      */
242     private double calcUsageCharge()
243     {
244         return (50 + calcAdditionalDataFee()) * 0.03;
245     }
246
247     /**
248      * The total monthly fee is the sum of the service cost,
249      * usage charge, and administrative fees
250      * @return The total monthly fee in dollars
251      */
252     private double calcTotalFee()
253     {
254         return calcUsageCharge() + calcAdditionalDataFee() + 50 + .61;
255     }
256
257     /**
258      * Formats the phone number into format: (xxx) xxx-xxxx
259      * @return Formatted phone number
260      */
261     private String fmtPhoneNumber()
262     {
263         return "(" + number.substring(0, 3) + ") " +
264             number.substring(3, 6) + "-" + number.substring(6, 10);
265     }
266 }
267
```