

```
1 import java.util.HashMap;
2 import java.util.Map;
3 import java.util.Random;
4
5 public class LinkShortener {
6     private Map<String, String> shortToLongMap;
7     private Map<String, String> longToShortMap;
8
9     public LinkShortener() {
10         shortToLongMap = new HashMap<>();
11         longToShortMap = new HashMap<>();
12     }
13
14     public String shortenLink(String longUrl) {
15         if (longToShortMap.containsKey(longUrl)) {
16             return longToShortMap.get(longUrl);
17         }
18
19         String shortUrl = generateShortUrl();
20         shortToLongMap.put(shortUrl, longUrl);
21         longToShortMap.put(longUrl, shortUrl);
22
23         return shortUrl;
24     }
25
26     public String expandLink(String shortUrl) {
27         return shortToLongMap.getOrDefault(shortUrl, "Link not found");
28     }
29 }
```

```
27     return shortUrl.getLongUrl().getOrDefault(shortUrl, "Link not found.");
28 }
29
30 private String generateShortUrl() {
31     // Implement your own logic for generating short URLs
32     // This could be based on base conversion, hashing, encoding, etc.
33     // For simplicity, let's use a random string for now.
34     String characters =
35         "ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789";
36     StringBuilder shortUrl = new StringBuilder();
37     Random random = new Random();
38
39     for (int i = 0; i < 8; i++) {
40         shortUrl.append(characters.charAt(random.nextInt(characters.length
41             ()))));
42     }
43
44     return shortUrl.toString();
45 }
46
47 // Add a method to display your user interface
48 // You can use a simple console-based UI or a graphical UI depending on
49 // your preference.
50
51 public static void main(String[] args) {
52     LinkShortener linkShortener = new LinkShortener();
53
54     // Example usage
55     String longUrl = "https://www.example.com";
56     String shortUrl = linkShortener.shortenLink(longUrl);
```

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```
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47 // Add a method to display your user interface
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49 // your preference.
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51 public static void main(String[] args) {
52     LinkShortener linkShortener = new LinkShortener();
53
54     // Example usage
55     String longUrl = "https://www.example.com";
56     String shortUrl = linkShortener.shortenLink(longUrl);
57
58     System.out.println("Shortened URL: " + shortUrl);
59     System.out.println("Expanded URL: " + linkShortener.expandLink(shortUrl
60         ));
61 }
62 }
```

Terminal

Shortened URL: akgNYtKZ
Expanded URL: https://www.example.com