

## Problem Solutions Approach

While solving this problem, I came up with two methods: first, I could extend the hashmap class and define an iterator, second, I could fill the hashmap array in main and push it to the custom iterator class and I can use its keyset, and navigate through the keys. So I choose the second one because I couldn't do the first one.

## Test Cases

Test Case	Condition
TC01	Fill the hashmap.
TC02	Print HashMap keys with values.
TC03	Create a new iterator parameter with key constructor.
TC04	Create a new iterator parameter with default constructor.
TC05	Iterates and print the key with next and prev, control with hasNext, with starting index.
TC06	Iterates and print the key with next and prev, control with hasNext, with starting index, '0'.

## Running Command and Results

```
HashMap<String, Integer> hashmap = new HashMap<String, Integer>();

// Adding mappings to HashMap
hashmap.put("Osman", 54);
hashmap.put("Omer", 80);
hashmap.put("Ali", 82);
hashmap.put("Furkan", 100);
hashmap.put("Faruk", 40);
hashmap.put("Ferdı", 30);
hashmap.put("Hasan", 20);
hashmap.put("Arda", 10);
hashmap.put("Yattara", 5);

// Printing the HashMap
System.out.println("Created hashmap is" +hashmap);

MapIterator<String,Integer> hmIterator = new MapIterator<String,Integer>("Faruk");

hmIterator.SetMap(hashmap);

System.out.println();
System.out.println();
System.out.println("First Hash Map With Key Constructor:");

while (hmIterator.hasNext()) {
    String key = hmIterator.next();
    String prevkey = hmIterator.prev();

    System.out.println("Next :"+hashmap.get(key) + " : " + key );
    System.out.println("Prev :"+hashmap.get(prevkey) + " :: " + prevkey);
    System.out.println();
}

MapIterator<String,Integer> hmIterator2 = new MapIterator<String,Integer>();

hmIterator2.SetMap(hashmap);

System.out.println();
System.out.println();
System.out.println("Second Hash Map With Default Constructor:");

while (hmIterator2.hasNext()) {
    String key = hmIterator2.next();
    String prevkey = hmIterator2.prev();

    System.out.println("Next :"+hashmap.get(key) + " : " + key );
    System.out.println("Prev :"+hashmap.get(prevkey) + " :: " + prevkey);
    System.out.println();
}
```

```
Created hashmap is{Arda=10, Yattara=5, Ferdi=30, Hasan=20, Faruk=40, Osman=54, Furkan=100, Omer=80, Ali=82}
```

```
First Hash Map With Key Constructor:
```

```
Next :54 : Osman  
Prev :40 :: Faruk
```

```
Next :100 : Furkan  
Prev :54 :: Osman
```

```
Next :80 : Omer  
Prev :100 :: Furkan
```

```
Next :82 : Ali  
Prev :80 :: Omer
```

```
Second Hash Map With Default Constructor:
```

```
Next :5 : Yattara  
Prev :10 :: Arda
```

```
Next :30 : Ferdi  
Prev :5 :: Yattara
```

```
Next :20 : Hasan  
Prev :30 :: Ferdi
```

```
Next :40 : Faruk  
Prev :20 :: Hasan
```

```
Next :54 : Osman  
Prev :40 :: Faruk
```

```
Next :100 : Furkan  
Prev :54 :: Osman
```

```
Next :80 : Omer  
Prev :100 :: Furkan
```

```
Next :82 : Ali  
Prev :80 :: Omer
```

```
HashMap<String, Integer> hashmap = new HashMap<String, Integer>();
```

```
// Adding mappings to HashMap
```

```
hashmap.put("Osman", 54);  
hashmap.put("Omer", 80);  
hashmap.put("Ali", 82);  
hashmap.put("Furkan", 100);  
hashmap.put("Faruk", 40);  
hashmap.put("Ferdı", 30);  
hashmap.put("Hasan", 20);  
hashmap.put("Arda", 10);  
hashmap.put("Yattara", 5);
```

```
// Printing the HashMap
```

```
System.out.println("Created hashmap is" +hashmap);
```

```
MapIterator<String,Integer> hmIterator = new MapIterator<String,Integer>("Ali");
```

```
hmIterator.SetMap(hashmap);
```

```
System.out.println();  
System.out.println();  
System.out.println("First Hash Map With Key Constructor:");
```

```
while (hmIterator.hasNext()) {  
    String key = hmIterator.next();  
    String prevkey = hmIterator.prev();  
  
    System.out.println("Next :"+hashmap.get(key) + " : " + key );  
    System.out.println("Prev :"+hashmap.get(prevkey) + " :: " + prevkey);  
    System.out.println();  
}
```

```
MapIterator<String,Integer> hmIterator2 = new MapIterator<String,Integer>();
```

```
hmIterator2.SetMap(hashmap);
```

```
System.out.println();  
System.out.println();  
System.out.println("Second Hash Map With Default Constructor:");
```

```
while (hmIterator2.hasNext()) {  
    String key = hmIterator2.next();  
    String prevkey = hmIterator2.prev();  
  
    System.out.println("Next :"+hashmap.get(key) + " : " + key );  
    System.out.println("Prev :"+hashmap.get(prevkey) + " :: " + prevkey);  
    System.out.println();  
}
```

```
Created hashmap is{Arda=10, Yattara=5, Ferdi=30, Hasan=20, Faruk=40, Osman=54, Furkan=100, Omer=80, Ali=82}
```

First Hash Map With Key Constructor:

```
Next :20 : Hasan  
Prev :30 :: Ferdi
```

```
Next :40 : Faruk  
Prev :20 :: Hasan
```

```
Next :54 : Osman  
Prev :40 :: Faruk
```

```
Next :100 : Furkan  
Prev :54 :: Osman
```

```
Next :80 : Omer  
Prev :100 :: Furkan
```

```
Next :82 : Ali  
Prev :80 :: Omer
```

Second Hash Map With Default Constructor:

```
Next :5 : Yattara  
Prev :10 :: Arda
```

```
Next :30 : Ferdi  
Prev :5 :: Yattara
```

```
Next :20 : Hasan  
Prev :30 :: Ferdi
```

```
Next :40 : Faruk  
Prev :20 :: Hasan
```

```
Next :54 : Osman  
Prev :40 :: Faruk
```

```
Next :100 : Furkan  
Prev :54 :: Osman
```

```
Next :80 : Omer  
Prev :100 :: Furkan
```

```
Next :82 : Ali  
Prev :80 :: Omer
```