

Homework 7

source code: (with Heap.java inside package com)

```
// Homework7.java
```

```
package com;
```

```
import java.util.Comparator;
```

```
public class Homework7 {
```

```
    public static <E> void outputSorted(Person[] arr, Comparator<? super Person> comparator) {
```

```
        // create a heap
```

```
        Heap<Person> heap = new Heap<Person>(comparator);
```

```
        // insert data into heap
```

```
        for(int i = 0; i < arr.length; i++) {  
            heap.insert(arr[i]);  
        }
```

```
        // print the sorted array
```

```
        while(!heap.isEmpty()) {  
            System.out.print(heap.extract().name);  
            System.out.print(" ");  
        }
```

```
        System.out.println();
```

```
    }
```

```
    public static void main(String[] args) {
```

```
        // Create test cases
```

```
        Person[] persons = {  
            new Person("David", 35, 170),  
            new Person("Amelia", 20, 197),  
            new Person("Olivia", 80, 154),  
            new Person("Elwood", 66, 187),  
            new Person("Bruce", 17, 198),  
            new Person("Simon", 45, 179),  
        };
```

```
    }
```

```
        // test the results
```

```
        outputSorted(persons, new CompareByName());  
        outputSorted(persons, new CompareByAge());  
        outputSorted(persons, new CompareByHeight());
```

```
    }
```

```
// Person.java
```

```
package com;

public class Person {
    String name;
    int age;
    double height;

    public Person(String name, int age, int height) {
        this.name = name;
        this.age = age;
        this.height = height;
    }
}
```

```
// CompareByName.java
```

```
package com;

import java.util.Comparator;

public class CompareByName implements Comparator<Person>{
    public int compare(Person p1, Person p2) {
        return -p1.name.compareTo(p2.name);
    }
}
```

```
// CompareByAge.java
```

```
package com;

import java.util.Comparator;

public class CompareByAge implements Comparator<Person>{
    public int compare(Person p1, Person p2) {
        if(p1.age > p2.age) {
            return 1;
        }
        if(p1.age < p2.age) {
            return -1;
        }
        return 0;
    }
}
```

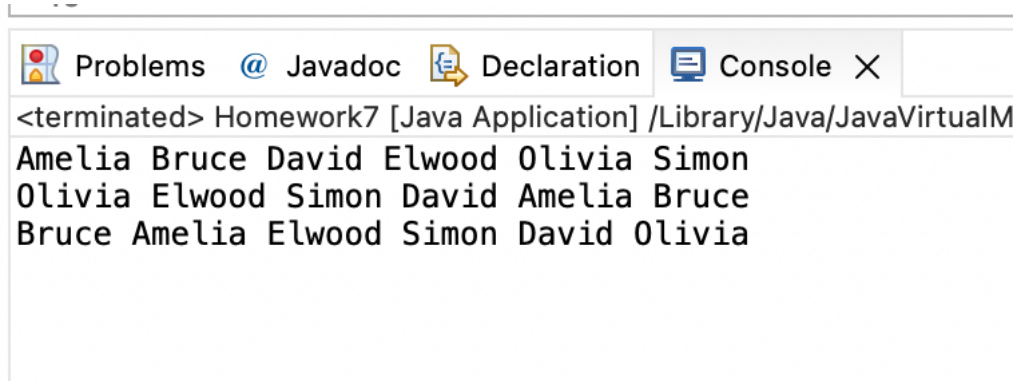
```
// CompareByHeight.java
```

```
package com;

import java.util.Comparator;

public class CompareByHeight implements Comparator<Person>{
    public int compare(Person p1, Person p2) {
        if(p1.height > p2.height) {
            return 1;
        }
        if(p1.height < p2.height) {
            return -1;
        }
        return 0;
    }
}
```

Output:



The screenshot shows an IDE window with a tab labeled 'Console'. The console output displays the result of a Java application named 'Homework7'. The output consists of three lines of names, each line representing a different sorting criterion: sorted by name, sorted by age, and sorted by height. The names are: Amelia, Bruce, David, Elwood, Olivia, and Simon.

```
<terminated> Homework7 [Java Application] /Library/Java/JavaVirtualM  
Amelia Bruce David Elwood Olivia Simon  
Olivia Elwood Simon David Amelia Bruce  
Bruce Amelia Elwood Simon David Olivia
```

By Name:

Amelia Bruce David Elwood Olivia Simon

By Age:

Olivia Elwood Simon David Amelia Bruce

By Height:

Bruce Amelia Elwood Simon David Olivia