for–each Loop (Enhanced for Loop)

zyBook Chap 7.9

for-each Loop (Enhanced for Loop)

- Simplifies certain array loops

- Provides the ability to examine each element of an array
  - **ONLY** allows elements to be **accessed** forward **from** the **first** element **to** the **last** element

for Loop

```java
for(int i = 0; i < <arrayName>.length; ++i) {
    <type> <varName> = <arrayName>[i];
    <statement(s) using varName>;
}
```

for-each Loop

```java
for(<type> <varName> : <arrayName>) {
    <statement(s) using varName>;
}
```

Equivalent Implementations

```java
// Using for loop to print out each element in the array
for (int i = 0; i < arr.length; ++i) {
    int element = arr[i];
    System.out.println(element);
}


// Using for-each loop to print out each element in the array
for (int element : arr) {
    System.out.println(element);
}
```

Limitations

- Cannot be used to **modify** array

```
// Only changes num, not the array.
for (int num : numbers) {
    num = num * 2;
}


// Equivalent implementation
for (int i = 0; i < numbers.length; ++i) {
    int num = numbers[i] * 2;
}
```

Limitations

- Cannot be used to **access index**

```java
// Example: Return the index of target value in the array
for (int num : numbers) {
    if (num == target) {
        return ???; // Cannot get the index
    }
}

for (int i = 0; i < numbers.length; ++i) {
    int num = numbers[i];
    if (num == target) {
        return i; // Can get the index
    }
}
```