

## Java Variables – Part 2

Considering the LetterOfEmployment.java in the previous section, it is still less efficient due to its usability. If the program needs to be used to generate a new letter with a new set of information, a programmer still needs to edit the values assigned to each variable. Once the program is edited, it needs to be recompiled and executed which cannot be performed by any user. To optimize this program to make it not only efficient reusability but also better performance, the values that are assigned to each variable should be acquired when the program is executed.

### Acquiring input from Scanner Object

**Scanner** is a Java predefined class that can be used to acquire input that can be fed to your code and be executed. Here are the steps to create a Scanner.

1. Scanner is a class that needs to be manually imported to a Java program for its existence. This process requires a program to write an **import statement**.

An import statement must be placed outside a Java Class as shown below.

```
1  import java.util.Scanner;
2
3  public class LetterOfEmployment {
4      public static void main(String [] args) {
5
6      }
7  }
```

To begin an import statement, a Java keyword, “import” is used and followed by a **Java library** that needs to be included in your program. The statement “java.util.Scanner” refers to the Scanner class resides in “util” folder that is a subfolder inside “java” folder. The following shows the stricter of where Scanner class is located.

- java (folder)
  - util (folder)
    - Scanner (Java Class)

Java Development Kit (JDK) that is installed on your computer system contains a number of Java Libraries such as Scanner, System, String, i.e. There is a special Java Library that do not need to be manually imported which is “java.lang”. It is automatically imported once a Java program is created. System and String are two of many objects that reside in the library. That is why a programmer can just use the two classes without having to use an import statement for System and String.

2. After a Scanner is imported, a Scanner object can be created inside a Java class. A valid syntax for creating a Scanner is shown below.

```

1  import java.util.Scanner;
2
3  public class LetterOfEmployment {
4      public static void main(String [] args) {
5          Scanner input = new Scanner(System.in);
6      }
7  }

```

- Declare a Scanner object
  - i. **Scanner** class to identify the type of object
  - ii. Name of **object** (Conventional way of naming a variable should be applied)
- Initialize a Scanner object
  - i. Assignment operator (=)
  - ii. A Java keyword, **new**, indicates allocation of memory space for this Scanner object.
  - iii. **Scanner** after the new keyword indicates the new memory space is for a Scanner
  - iv. **System.in** in the parentheses indicates the use of the Scanner object. In this case, it will be used to acquire input from keyboard.

### To begin acquiring input from the user

1. Generate a prompt to acquire an input using System.out.print(): First prompt is asking the user to enter a prefix such as Mr., Ms, Mrs, i.e.

```

1  import java.util.Scanner;
2
3  public class LetterOfEmployment {
4      public static void main(String [] args) {
5          Scanner input = new Scanner(System.in);
6          System.out.print("Enter Name Prefix:");
7      }
8  }

```

2. Generate an input box using the Scanner object named **input** which is **created** previously then use it to **call (using . notation)** a Scanner's method, **next()**, to perform acquiring an input.

```

1  import java.util.Scanner;
2
3  public class LetterOfEmployment {
4      public static void main(String [] args) {
5          Scanner input = new Scanner(System.in);
6          System.out.print("Enter Name Prefix:");
7          String prefix = input.next();
8      }
9  }

```

When the program is executed, the prompt should appear with an input box, generated from **input.next()** that the user can enter an input.

```
> run LetterOfEmployment
Enter Name Prefix: 
```

In this input box, information can be entered. To proceed, hit enter.

```
> run LetterOfEmployment
Enter Name Prefix: 
```

Once the “Enter” button on your keyboard is hit, the information, **Mr.**, is then saved in the String variable, **prefix**, for later use.

```
7 String prefix = input.next();
```

**Note:** **next()** is a Scanner’s method provided to acquire an input as a **one-word String** as shown on line 7. When **next()** is called, the variable type to save information must be a **String**.

### 3. Acquiring additional inputs by generating more prompts and input boxes

```
1 import java.util.Scanner;
2
3 public class LetterOfEmployment {
4     public static void main(String [] args) {
5         Scanner input = new Scanner(System.in);
6         System.out.print("Enter Name Prefix:");
7         String prefix = input.next();
8         System.out.print("Enter First Name:");
9         String firstName = input.next();
10        System.out.print("Enter Last Name:");
11        String lastName = input.next();
12    }
13 }
```

Notice that **each prompt** is used to display proper information according to its expected input.

4. Method `next()` allows input as a word to be entered. Any expected input that contains multiple words must be acquired by using a method, **`nextLine()`**.

```
12     String company = "ABC Company";
13     String address = "2807 N Glebe Rd, Arlington, VA 22207";
14     input.nextLine();
15     System.out.print("Enter Job Title:");
16     String jobTitle = input.nextLine();
17     System.out.print("Enter Hired Date:");
18     String dateHired = input.next();
19     System.out.print("Enter Annual Salary:");
20     String annualSalary = input.next();
```

For example, job title can be either one word or multiple words such as Accountant, Software Developer, Director of Information Technology, i.e. To acquire such information, `.nextLine()` is used for the String `jobTitle`.

Note: When using `nextLine()` method in between `.next()` method, **Scanner object's buffer must be cleared** before continuing. To clear the buffer, programmer can simply use **`input.nextLine()`**.

5. After acquiring all input needed for the program, it can then be used to process according to the purpose of program.

```
1  import java.util.Scanner;
2
3  public class LetterOfEmployment {
4      public static void main(String [] args) {
5          Scanner input = new Scanner(System.in);
6          System.out.print("Enter Name Prefix:");
7          String prefix = input.next();
8          System.out.print("Enter First Name:");
9          String firstName = input.next();
10         System.out.print("Enter Last Name:");
11         String lastName = input.next();
12         String company = "ABC Company";
13         String address = "2807 N Glebe Rd, Arlington, VA 22207";
14         input.nextLine();
15         System.out.print("Enter Job Title:");
16         String jobTitle = input.nextLine();
17         System.out.print("Enter Hired Date:");
18         String dateHired = input.next();
19         System.out.print("Enter Annual Salary:");
20         String annualSalary = input.next();
21
22         System.out.print("Dear Sir or Madam:");
23         System.out.print("\n\nThis letter is to confirm that " + firstName + " " + lastName + " is presently employed by ";
24         System.out.print(company + ", in the position of " + jobTitle + " on a full time basis. " + firstName + " " + lastName);
25         System.out.print(" commenced employment with company on " + dateHired + " and is presently paid $" + annualSalary);
26         System.out.print(" based salary per year.\n\n" + company + " is located at " + address + ".");
27         System.out.print("\n\nIf you require any additional information about " + company + " and/or " + prefix + lastName);
28         System.out.print(", please do not hesitate to contact us.\n\nSincerely,\n\n\n");
29     }
30 }
```