UNIVERSITY OF ENGINEERING AND TECHNOLOGY, TAXILA

SOFTWARE ENGINEERING

OOP-LAB 3

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REG NO: 20-SE-56
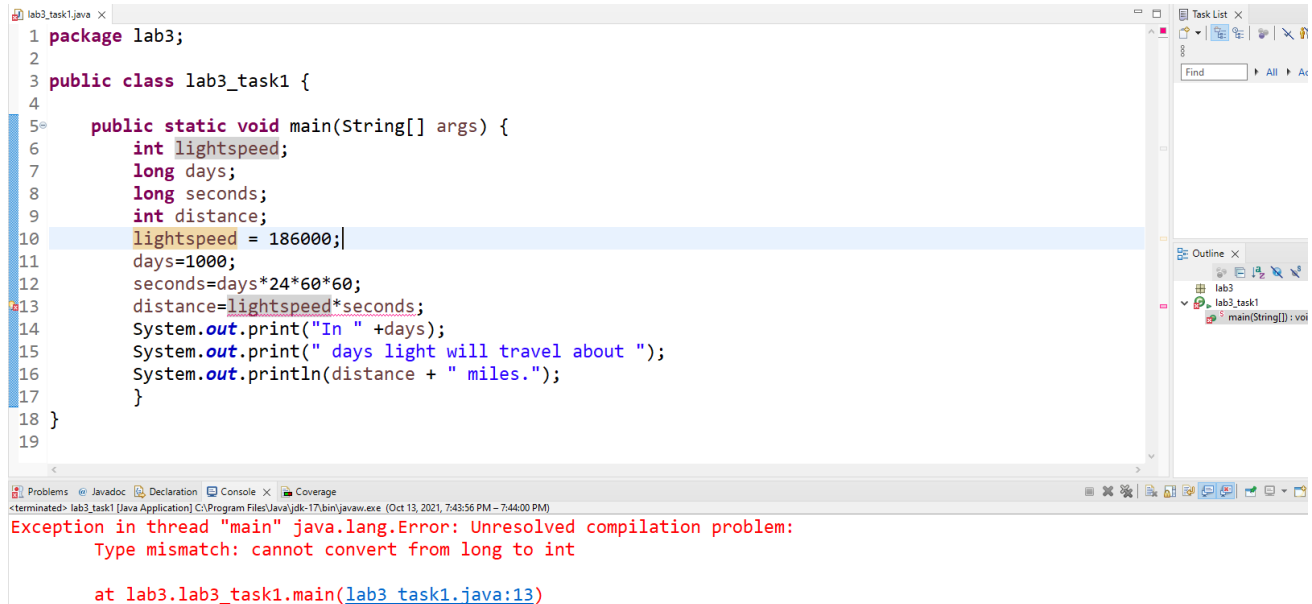
COURSE: OOP-LAB

DATED: October 16, 2021

TASK-1

In Light.java, declare distance as int type and see the results.

```java
package lab3;

public class lab3_task1 {

    public static void main(String[] args) {
        int lightspeed;
        long days;
        long seconds;
        int distance;
        lightspeed = 186000;
        days=1000;
        seconds=days*24*60*60;
        distance=lightspeed*seconds;
        System.out.print("In " +days);
        System.out.print(" days light will travel about ");
        System.out.println(distance + " miles.");
        }
}
```

```java
 1 package lab3;
 2
 3 public class lab3_task1 {
 4
 5⊖    public static void main(String[] args) {
 6         int lightspeed;
 7         long days;
 8         long seconds;
 9         int distance;
10         lightspeed = 186000;|
11         days=1000;
12         seconds=days*24*60*60;
13         distance=lightspeed*seconds;
14         System.out.print("In " +days);
15         System.out.print(" days light will travel about ");
16         System.out.println(distance + " miles.");
17         }
18 }
19
```

```
Problems  @ Javadoc  🔍 Declaration  🖳 Console ×  📄 Coverage
<terminated> lab3_task1 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Oct 13, 2021, 7:43:56 PM – 7:44:00 PM)
Exception in thread "main" java.lang.Error: Unresolved compilation problem:
        Type mismatch: cannot convert from long to int

        at lab3.lab3_task1.main(lab3_task1.java:13)
```
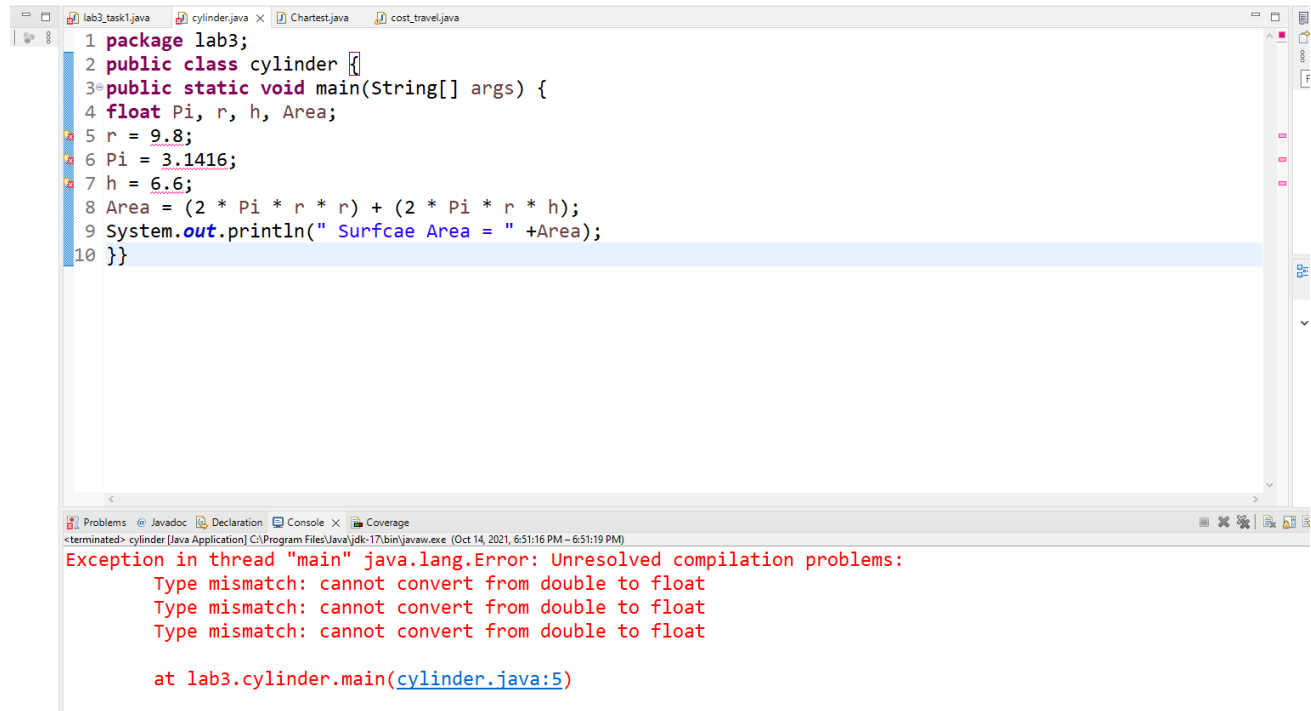
In this program when we declare distance as integer type .it prompts an error because when lightspeed and seconds are multiplied answer is stored in long data-type but we have distance in int type .
So it is impossible to convert long into int type automatically.

TASK-2

In Cylinder.java change data type to float and see the difference. If an error occurs, then correct the code.

When we change the data type to float than error prompts.because we know that by default it is always double so it is impossible to convert automatically the double into float.following errors prompt in this situation.

```
lab3_task1.java    cylinder.java ×    Chartest.java    cost_travel.java
 1 package lab3;
 2 public class cylinder {
 3 public static void main(String[] args) {
 4 float Pi, r, h, Area;
 5 r = 9.8;
 6 Pi = 3.1416;
 7 h = 6.6;
 8 Area = (2 * Pi * r * r) + (2 * Pi * r * h);
 9 System.out.println(" Surfcae Area = " +Area);
10 }}
```

```
Problems  @ Javadoc  Declaration  Console ×  Coverage
<terminated> cylinder [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Oct 14, 2021, 6:51:16 PM – 6:51:19 PM)
Exception in thread "main" java.lang.Error: Unresolved compilation problems:
        Type mismatch: cannot convert from double to float
        Type mismatch: cannot convert from double to float
        Type mismatch: cannot convert from double to float

        at lab3.cylinder.main(cylinder.java:5)
```

There are two possible ways to correct this error.

METHOD-1

We know that in order to specify float we have to write f with value to declare it as a float type variable.

Following correction is made to correct the program:

```
package lab3;
public class cylinder {
public static void main(String[] args) {
float Pi, r, h, Area;
r = 9.8f;
Pi = 3.1416f;
h = 6.6f;
Area = (2 * Pi * r * r) + (2 * Pi * r * h);
```

```
System.out.println(" Surfcae Area = " +Area);
}
}
```

```
                      lab3_task1.java    cylinder.java ×    Chartest.java    cost_travel.java
  1 package lab3;
  2 public class cylinder {
  3 public static void main(String[] args) {
  4 float Pi, r, h, Area;
  5 r = 9.8f;
  6 Pi = 3.1416f;
  7 h = 6.6f;
  8 Area = (2 * Pi * r * r) + (2 * Pi * r * h);
  9 System.out.println(" Surfcae Area = " +Area);
 10 }}
```

Problems @ Javadoc Declaration Console × Coverage
<terminated> cylinder [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Oct 14, 2021, 6:56:15 PM – 6:56:18 PM)
```
 Surfcae Area = 1009.83594
```

METHOD-2

Another way to solve this problem is converting this double data types into float by narrowing type converstion as shown below

```
package lab3;
public class cylinder {
public static void main(String[] args) {
float Pi, r, h, Area;
r = (float)9.8;
Pi = (float)3.1416;
h = (float)6.6;
Area = (2 * Pi * r * r) + (2 * Pi * r * h);
System.out.println(" Surfcae Area = " +Area);
}
}
```

```
   1 package lab3;
   2 public class cylinder {
   3 public static void main(String[] args) {
   4 float Pi, r, h, Area;
   5 r = (float)9.8;
   6 Pi = (float)3.1416;
   7 h = (float)6.6;
   8 Area = (2 * Pi * r * r) + (2 * Pi * r * h);
   9 System.out.println(" Surfcae Area = " +Area);
  10 }
  11 }
```

Problems @ Javadoc Declaration Console × Coverage
<terminated> cylinder [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Oct 15, 2021, 10:25:44 AM – 10:25:48 AM)
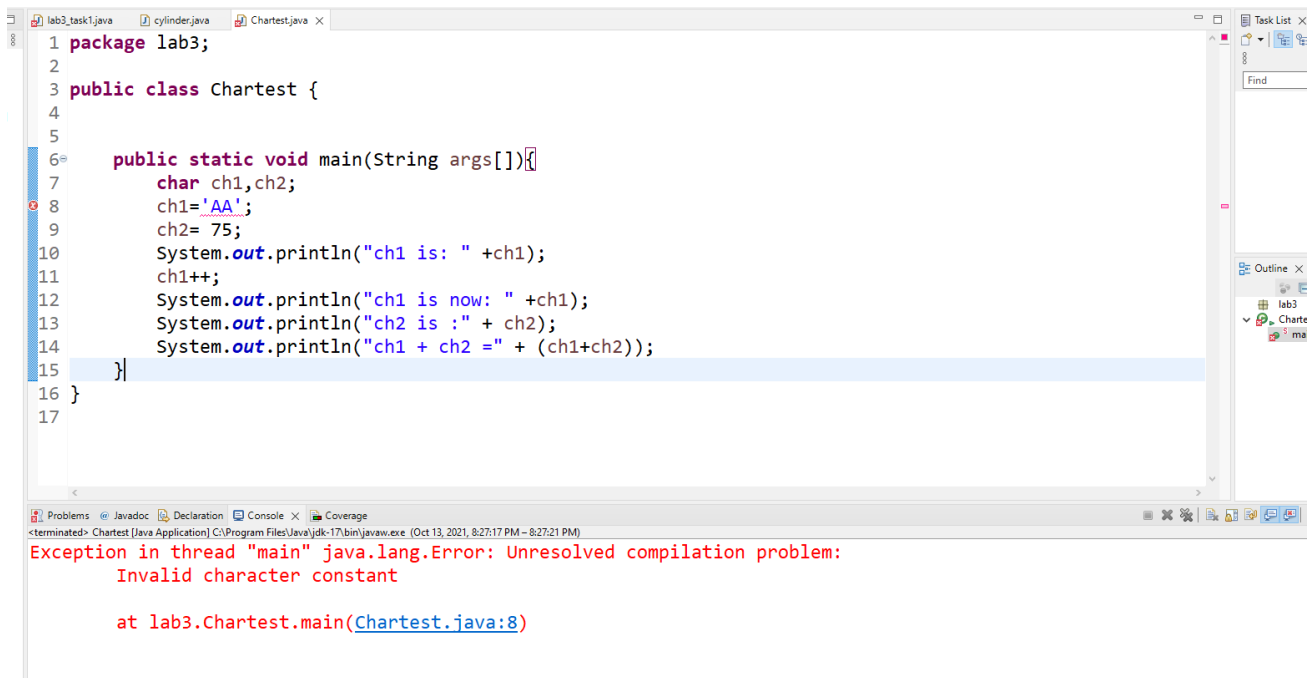```
Surfcae Area = 1009.83594
```

# TASK-3

1. **In Chartest.java change ch1= 'AA' and see the result.**

```java
package lab3;

public class Chartest {

    public static void main(String args[]){
        char ch1,ch2;
        ch1='AA';
        ch2= 75;
        System.out.println("ch1 is: " +ch1);
        ch1++;
        System.out.println("ch1 is now: " +ch1);
        System.out.println("ch2 is :" + ch2);
        System.out.println("ch1 + ch2 =" + (ch1+ch2));
    }
}
```

```
1 package lab3;
2
3 public class Chartest {
4
5
6⊖    public static void main(String args[]){
7        char ch1,ch2;
8        ch1='AA';
9        ch2= 75;
10        System.out.println("ch1 is: " +ch1);
11        ch1++;
12        System.out.println("ch1 is now: " +ch1);
13        System.out.println("ch2 is :" + ch2);
14        System.out.println("ch1 + ch2 =" + (ch1+ch2));
15    }
16 }
17
```

Problems @ Javadoc 🔍 Declaration 🖥 Console × 📈 Coverage
<terminated> Chartest [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Oct 13, 2021, 8:27:17 PM – 8:27:21 PM)
```
Exception in thread "main" java.lang.Error: Unresolved compilation problem:
        Invalid character constant

        at lab3.Chartest.main(Chartest.java:8)
```

<mark>EXPLANATION</mark>

We know that in character type only one character is allowed .thats why it shows an error saying"Invalid character constant"

---

2. **In Chartest.java change ch1= '' and see the result.**

```
package lab3;

public class Chartest {

    public static void main(String args[]){
        char ch1,ch2;
        ch1='';
        ch2= 75;
        System.out.println("ch1 is: " +ch1);
        ch1++;
        System.out.println("ch1 is now: " +ch1);
        System.out.println("ch2 is :" + ch2);
        System.out.println("ch1 + ch2 =" + (ch1+ch2));
    }
}
```

```
      lab3_task1.java      cylinder.java      Chartest.java ×
    1 package lab3;
    2
    3 public class Chartest {
    4
    5
    6⊖     public static void main(String args[]){
    7            char ch1,ch2;
  ⊗ 8            ch1='';
    9            ch2= 75;
   10            System.out.println("ch1 is: " +ch1);
   11            ch1++;
   12            System.out.println("ch1 is now: " +ch1);
   13            System.out.println("ch2 is :" + ch2);
   14            System.out.println("ch1 + ch2 =" + (ch1+ch2));
   15        }
   16 }
   17
```

Problems @ Javadoc 🔲 Declaration 🔲 Console × 🔲 Coverage
<terminated> Chartest [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Oct 13, 2021, 8:33:27 PM – 8:33:33 PM)
Exception in thread "main" java.lang.Error: Unresolved compilation problem:
        Invalid character constant

        at lab3.Chartest.main(Chartest.java:8)

EXPLANATION

In this program there is same issue as for a character variable there must be a single character in the single quotations ,now here it is empty that's why It shows an error "Invalid character constant"

---

3. **In Chartest.java change ch1= "A" and see the result.**

```java
package lab3;

public class Chartest {

    public static void main(String args[]){
        char ch1,ch2;
        ch1="A";
        ch2= 75;
        System.out.println("ch1 is: " +ch1);
        ch1++;
        System.out.println("ch1 is now: " +ch1);
        System.out.println("ch2 is :" + ch2);
        System.out.println("ch1 + ch2 =" + (ch1+ch2));
    }
}
```

We know that for character data type single character is written ,and also in single quotation .but here we have double quotation which make it as a string data type.thats why it type mismatch error in automatic conversion from string to char.

TASK-4

In Chartest.java (e) initialize ch1= '75' and see the result.

```java
package lab3;

public class Chartest {

    public static void main(String args[]){
        char ch1,ch2;
        ch1='75';
        ch2= 75;
        System.out.println("ch1 is: " +ch1);
        ch1++;
        System.out.println("ch1 is now: " +ch1);
        System.out.println("ch2 is :" + ch2);
        System.out.println("ch1 + ch2 =" + (ch1+ch2));
    }
```

```
                                                }
      lab3_task1.java    cylinder.java    Chartest.java ×
    1 package lab3;
    2
    3 public class Chartest {
    4
    5
    6⊖     public static void main(String args[]){
    7           char ch1,ch2;
 ⊗  8           ch1='75';
    9           ch2= 75;
   10           System.out.println("ch1 is: " +ch1);
   11           ch1++;
   12           System.out.println("ch1 is now: " +ch1);
   13           System.out.println("ch2 is :" + ch2);
   14           System.out.println("ch1 + ch2 =" + (ch1+ch2));
   15       }
   16 }
   17 |
```

```
 Problems  @ Javadoc  Declaration  Console ×  Coverage
<terminated> Chartest [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Oct 13, 2021, 8:36:14 PM – 8:36:18 PM)
Exception in thread "main" java.lang.Error: Unresolved compilation problem:
        Invalid character constant

        at lab3.Chartest.main(Chartest.java:8)
```

==EXPLANATION==

Again for a character type variable there must be a single character in single quotation,here we have
two characters in quotation ,if we had to use 75 than it must be without any quotation.because single
quotation can store only one character.

TASK-5

**Write a Java program to calculate the total cost of travelling in dollars (int) from first city to
second city.**
User Input:
Ask the user for the following.
• Starting city name (String),
• Ending city name (String),
• Distance in miles between cities (int),
• Cost of travel per mile (double).

```java
package lab3;
import java.util.Scanner;
public class cost_travel {
public static void main(String[] args) {
            //created a new scanner object
        Scanner input = new Scanner(System.in);
        System.out.println("Enter The Starting City: ");
        String  start= input.nextLine();
```

```java
        System.out.println("Enter The Ending City: ");
        String  end= input.nextLine();

        System.out.println("Enter Distance in miles between two cities: ");
        int  dis_mile= input.nextInt();
            System.out.println("Enter the cost of Travel per Mile: ");
            double  cost_mile= input.nextDouble();
                //converting answer into int data type
                int cost_travel=(int)(dis_mile*cost_mile);

                    System.out.println("The cost of Travelling From
"+start +" to "+end+" is "+cost_travel+"$");
}
}
```

```
lab3_task1.java    cylinder.java    Chartest.java    cost_travel.java ×
 1 package lab3;
 2 import java.util.Scanner;
 3 public class cost_travel {
 4 public static void main(String[] args) {
 5         //created a new scanner object
 6     Scanner input = new Scanner(System.in);
 7     System.out.println("Enter The Starting City: ");
 8     String  start= input.nextLine();
 9
10     System.out.println("Enter The Ending City: ");
11     String  end= input.nextLine();
12
13     System.out.println("Enter Distance in miles between two cities: ");
14     int  dis_mile= input.nextInt();
15         System.out.println("Enter the cost of Travel per Mile: ");
16         double  cost_mile= input.nextDouble();
17             //converting answer into int data type
18             int cost_travel=(int)(dis_mile*cost_mile);
19
20                 System.out.println("The cost of Travelling From "+start +" to "+end+" is "+cost_travel+"$");
21 }
22 }
```

```
Problems  @ Javadoc  Declaration  Console ×  Coverage
<terminated> cost_travel [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe  (Oct 14, 2021, 7:28:51 PM – 7:29:14 PM)
Enter The Starting City:
Mianwali
Enter The Ending City:
Taxila
Enter Distance in miles between two cities:
300
Enter the cost of Travel per Mile:
2
The cost of Travelling From Mianwali to Taxila is 600$
```

EXPLANATION

In this program we were asked to make a program that will:
 ➤ Ask user to enter starting city (in String)
 ➤ Ask user to enter ending city (in String)
 ➤ Ask user to enter the distance in miles between these two cities(int)
 ➤ Than enter the cost of travel per mile(double)

    Than we have to calculate the cost of travelling from one city to another in the dollors(int)type.

    So first I created a scanner object
 ➤ Than using scanner class I took all inputs from user:

- Staring city (String)
- Ending city (String)
- Distance (int)
- Cost(double)

After this I created a integer type variable called `cost_travel` which was assigned values resulted from multiplication of distance(`dis_mile`)and cost(`cost_mile`).but as we know that distance is in int data type while cost is in double to answer will be stored in double data type but we have to store answer in int data type .that why I have used narrowing data conversion and answer is stored in int data type.