

CIS 36A :: Lab 01 - Java Fundamentals

Student Name:

Task 1: Definitions & Concepts

Instructions: Answer the questions below in one sentence.

1. Explain the difference between source code and object code.
=> Source code is typically what the human writes themselves, while object code is what comes out after compiling.
2. What is Java **bytecode** and how does it differ from **machine code**?
=> Machine code is binary and directly interpretable by machines, whereas Java byte code is non runnable and needs an interpreter to convert it into machine code.
3. Write three reasons why you should learn Java?
=> Java has a lot of the fundamentals of most other object oriented programming language so it's highly applicable elsewhere.
Java itself is used in a very large amount of applications, making it a useful language to know.
Java is also easy to learn and has massive amounts of documentation for all levels of expertise.

Task 2: Understanding Programming

Instructions: Answer each question below. Try to understand and explain the code. You do not need to test any code with an IDE. **Do not put an IDE code screenshot.**

1. **Exercise 26:** Use **indentation**, **spacing**, and **multiple lines** to make the following program more readable.

```
/* This program computes and prints the sum of the first 10 positive
integers */ class SumFrom1To10{public static void main(String[] args){int
sum,i;sum=0;for(i=1;i<=10;i++)sum=sum+i;System.out.println("The sum
1+2+...+10 is "+sum);}}
```

2. **Exercise 27:** Suggest more appropriate names for the class and the variables in the following program. Color your chances.

```
/* This program converts Fahrenheit to Celsius. */
class converter {
    public static void main(String[] args) {
        double x, xx;
        x = 62;
        xx = (x-32) * 5.0/9.0;
        System.out.print(x + " degrees Fahrenheit is ");
        System.out.println(xx + " degrees Celsius.");
    }
}
```

3. **Exercise 28:** Assume **x** is a variable that is declared as type **int**. What is wrong with each of the following statements?

A. `x = 3.5;` => 3.5 is a double or a float data type but is it's a integer value being assigned to them.

B. `if(x = 3)`

`x = 4; => if(x = 3)` is wrong. `x = 3` is assigning 3 to x instead of comparing. The correct syntax is `==`.

C. `x = "34"; => "34"` is a string data type, not an integer.

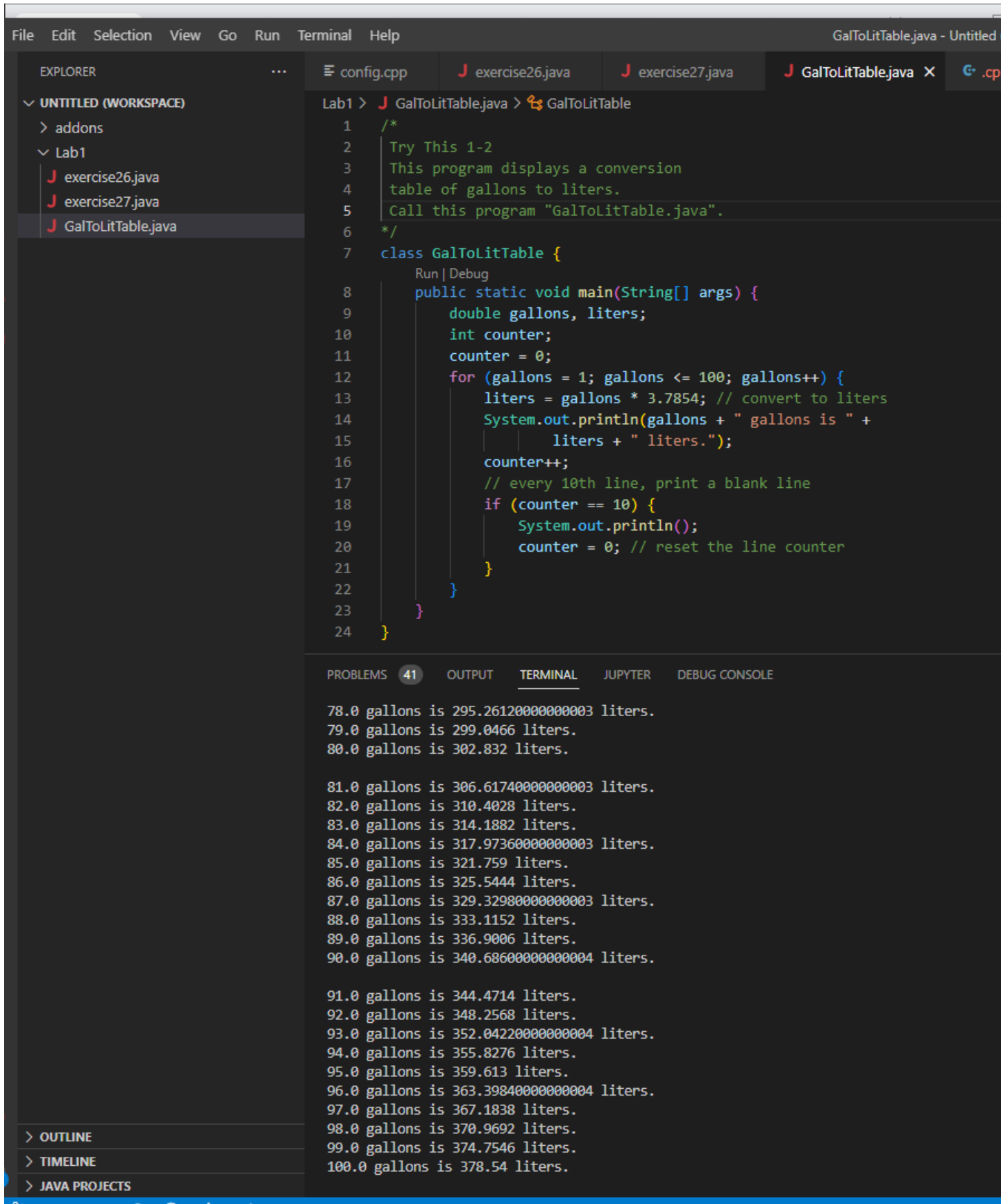
Task 3: Programming Exercises

Instructions: Use any IDE to write and execute below exercises from the book. Attach Snipping photos of your **source code** and **test run of the code in the console**. Make sure to create separate files for each exercise.

Sample Screenshot that shows both your code and output with command line
[REMOVE THIS BEFORE SUBMISSION]

Chapter 1 Exercises (Page 39-41)

1. TRY THIS 1-2 - GalToLit



The screenshot shows an IDE with the following components:

- EXPLORER:** A sidebar on the left showing a project structure with 'Lab1' containing 'exercise26.java', 'exercise27.java', and 'GalToLitTable.java'.
- Editor:** The main window displays the code for 'GalToLitTable.java'. The code includes a multi-line comment and a Java class with a 'main' method that uses a 'for' loop to calculate and print conversions from gallons to liters.
- Terminal:** The bottom panel shows the output of the program, displaying 100 lines of conversion results (e.g., '78.0 gallons is 295.26120000000003 liters.').

```
1  /*
2  Try This 1-2
3  This program displays a conversion
4  table of gallons to liters.
5  Call this program "GalToLitTable.java".
6  */
7  class GalToLitTable {
8      public static void main(String[] args) {
9          double gallons, liters;
10         int counter;
11         counter = 0;
12         for (gallons = 1; gallons <= 100; gallons++) {
13             liters = gallons * 3.7854; // convert to liters
14             System.out.println(gallons + " gallons is " +
15                               liters + " liters.");
16             counter++;
17             // every 10th line, print a blank line
18             if (counter == 10) {
19                 System.out.println();
20                 counter = 0; // reset the line counter
21             }
22         }
23     }
24 }
```

78.0 gallons is 295.26120000000003 liters.
79.0 gallons is 299.0466 liters.
80.0 gallons is 302.832 liters.

81.0 gallons is 306.61740000000003 liters.
82.0 gallons is 310.4028 liters.
83.0 gallons is 314.1882 liters.
84.0 gallons is 317.97360000000003 liters.
85.0 gallons is 321.759 liters.
86.0 gallons is 325.5444 liters.
87.0 gallons is 329.32980000000003 liters.
88.0 gallons is 333.1152 liters.
89.0 gallons is 336.9006 liters.
90.0 gallons is 340.68600000000004 liters.

91.0 gallons is 344.4714 liters.
92.0 gallons is 348.2568 liters.
93.0 gallons is 352.04220000000004 liters.
94.0 gallons is 355.8276 liters.
95.0 gallons is 359.613 liters.
96.0 gallons is 363.39840000000004 liters.
97.0 gallons is 367.1838 liters.
98.0 gallons is 370.9692 liters.
99.0 gallons is 374.7546 liters.
100.0 gallons is 378.54 liters.

2. Use `System.out.println()` to write a program that prints a shape or a face, or a simple picture.

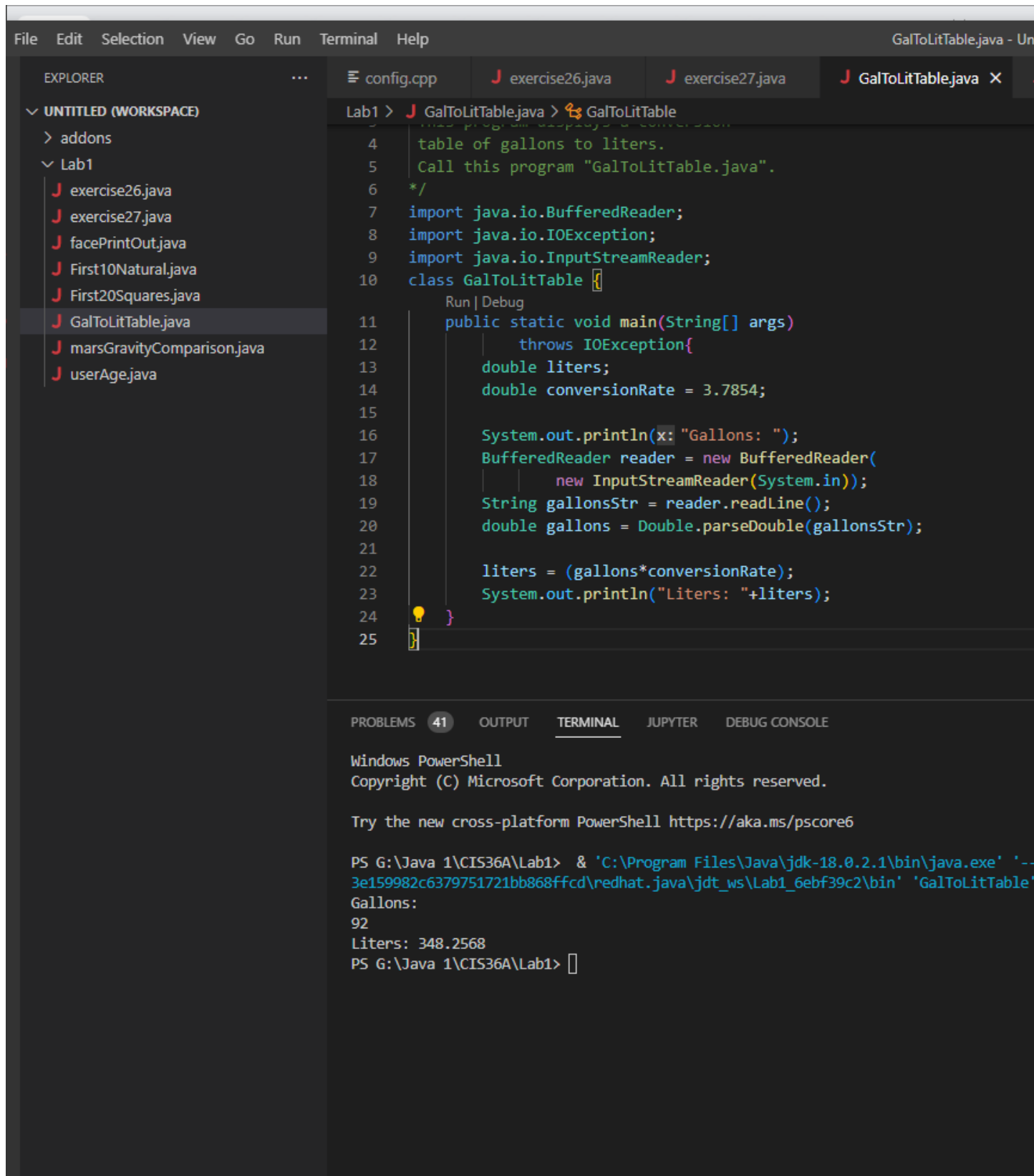
The screenshot shows an IDE with a dark theme. The Explorer panel on the left shows a project named 'UNTITLED (WORKSPACE)' with a folder 'addons' and a subfolder 'Lab1'. Inside 'Lab1', there are four Java files: 'exercise26.java', 'exercise27.java', 'facePrintOut.java' (which is selected), and 'GalToLitTable.java'. The main editor displays the code for 'facePrintOut.java'. The code is as follows:

```
1 public class facePrintOut {  
2     Run | Debug  
3     public static void main(String[] args) {  
4         System.out.println(x: "____");  
5         System.out.println(x: "| o o|");  
6         System.out.println(x: "| _ |");  
7         System.out.println(x: "____");  
8     }  
9 }
```

Below the editor, the 'TERMINAL' tab is active, showing the output of the program. The terminal text is:

```
Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.  
  
Try the new cross-platform PowerShell https://aka.ms/pscore6  
  
PS G:\Java 1\CIS36A\Lab1> & 'C:\Program Files\Java\jdk-18.0.2.1\bin\java.exe' '--enable-pr  
spaceStorage\17253e159982c6379751721bb868ffcd\redhat.java\jdt_ws\Lab1_6ebf39c2\bin' 'facePr  
  
_____  
| o o|  
| _ |  
_____  
  
PS G:\Java 1\CIS36A\Lab1>
```

3. Rewrite the GalToLit program so that it takes gallons as user input and prints out the liters.



The screenshot shows an IDE with the following components:

- EXPLORER:** A file tree on the left showing a project named 'Lab1' containing several Java files. 'GalToLitTable.java' is selected.
- Editor:** The main area displays the code for 'GalToLitTable.java'. The code is as follows:

```
1  // This program displays a conversion
2  // table of gallons to liters.
3  // Call this program "GalToLitTable.java".
4  //
5  */
6
7  import java.io.BufferedReader;
8  import java.io.IOException;
9  import java.io.InputStreamReader;
10
11 class GalToLitTable {
12     public static void main(String[] args)
13         throws IOException{
14         double liters;
15         double conversionRate = 3.7854;
16
17         System.out.println(x: "Gallons: ");
18         BufferedReader reader = new BufferedReader(
19             new InputStreamReader(System.in));
20         String gallonsStr = reader.readLine();
21         double gallons = Double.parseDouble(gallonsStr);
22
23         liters = (gallons*conversionRate);
24         System.out.println("Liters: "+liters);
25     }
26 }
```
- TERMINAL:** The bottom panel shows the command prompt output. It displays the command to run the program, followed by the input '92' and the output 'Liters: 348.2568'.

```
PS G:\Java 1\CIS36A\Lab1> & 'C:\Program Files\Java\jdk-18.0.2.1\bin\java.exe' --
3e159982c6379751721bb868ffcd\redhat.java\jdt_ws\Lab1_6ebf39c2\bin' 'GalToLitTable'
Gallons:
92
Liters: 348.2568
PS G:\Java 1\CIS36A\Lab1> 
```

4. **Mars's** gravity is about 37 percent of earth's. Write a program that computes and prints your effective weight on Mars.

The screenshot shows an IDE with a dark theme. The Explorer panel on the left shows a project structure with a 'Lab1' folder containing several Java files, including 'marsGravityComparison.java'. The main editor displays the code for 'marsGravityComparison.java', which is a Java class with a 'main' method. The code uses a 'for' loop to calculate and print weight on Earth and Mars for various Earth weights. The Terminal panel at the bottom shows the output of the program, displaying pairs of weights for Earth and Mars. The status bar at the bottom indicates the current directory is 'PS G:\Java 1\CIS36A\Lab1'.

```
File Edit Selection View Go Run Terminal Help marsGravityComparison.java - Untitled

EXPLORER
  UNTITLED (WORKSPACE)
    > addons
    > Lab1
      exercise26.java
      exercise27.java
      facePrintOut.java
      GalToLitTable.java
      marsGravityComparison.java

Lab1 > J marsGravityComparison.java > ...
1 public class marsGravityComparison {
2     Run | Debug
3     public static void main(String[] args)
4     {
5         double weightEarth;
6         double weightMars;
7         double conversionRate = 0.37;
8         for (weightEarth = 100; weightEarth <= 600; weightEarth++)
9         {
10             weightMars = (weightEarth*conversionRate);
11             System.out.println("Weight on Earth: " + weightEarth);
12             System.out.println("Weight on Mars: " + weightMars);
13             System.out.println();
14         }
15     }
16 }

PROBLEMS 41 OUTPUT TERMINAL JUPYTER DEBUG CONSOLE

Weight on Earth: 593.0
Weight on Mars: 219.41

Weight on Earth: 594.0
Weight on Mars: 219.78

Weight on Earth: 595.0
Weight on Mars: 220.15

Weight on Earth: 596.0
Weight on Mars: 220.52

Weight on Earth: 597.0
Weight on Mars: 220.89

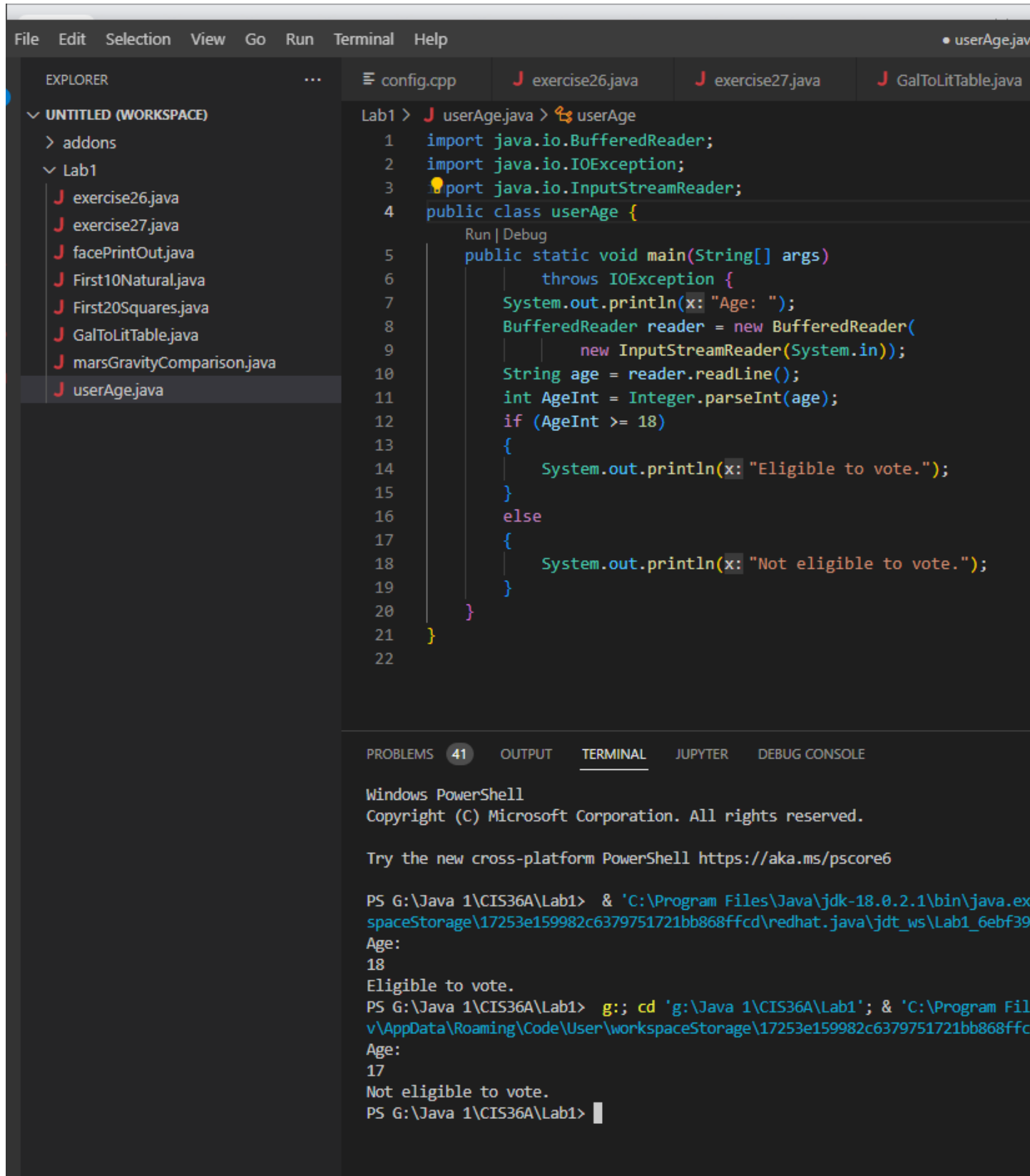
Weight on Earth: 598.0
Weight on Mars: 221.26

Weight on Earth: 599.0
Weight on Mars: 221.63

Weight on Earth: 600.0
Weight on Mars: 222.0

> OUTLINE
> TIMELINE
> JAVA PROJECTS
PS G:\Java 1\CIS36A\Lab1>
```

5. Write a program that takes the user's age as an integer (user's age can be input) and print if they can vote (You must be 18 years old to vote).



The screenshot shows an IDE with a dark theme. The Explorer panel on the left shows a project structure with a 'Lab1' folder containing several Java files, including 'userAge.java'. The main editor displays the code for 'userAge.java'. The code imports 'BufferedReader', 'IOException', and 'InputStreamReader', and defines a 'main' method that reads a line of input, parses it as an integer, and checks if it is greater than or equal to 18. The output is printed to the console. The bottom panel shows the 'TERMINAL' tab with the execution of the program, demonstrating the output for ages 18 and 17.

```
File Edit Selection View Go Run Terminal Help
EXPLORER
  > UNTITLED (WORKSPACE)
  > addons
  > Lab1
    J exercise26.java
    J exercise27.java
    J facePrintOut.java
    J First10Natural.java
    J First20Squares.java
    J GalToLitTable.java
    J marsGravityComparison.java
    J userAge.java
  ...
  config.cpp exercise26.java exercise27.java GalToLitTable.java userAge.java
Lab1 > J userAge.java > userAge
1 import java.io.BufferedReader;
2 import java.io.IOException;
3 import java.io.InputStreamReader;
4 public class userAge {
5     public static void main(String[] args)
6     {
7         throws IOException {
8             System.out.println(x: "Age: ");
9             BufferedReader reader = new BufferedReader(
10                 new InputStreamReader(System.in));
11             String age = reader.readLine();
12             int AgeInt = Integer.parseInt(age);
13             if (AgeInt >= 18)
14             {
15                 System.out.println(x: "Eligible to vote.");
16             }
17             else
18             {
19                 System.out.println(x: "Not eligible to vote.");
20             }
21         }
22     }
23 }
PROBLEMS 41 OUTPUT TERMINAL JUPYTER DEBUG CONSOLE
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS G:\Java 1\CIS36A\Lab1> & 'C:\Program Files\Java\jdk-18.0.2.1\bin\java.exe'
spaceStorage\17253e159982c6379751721bb868ffcd\redhat.java\jdt_ws\Lab1_6ebf39
Age:
18
Eligible to vote.
PS G:\Java 1\CIS36A\Lab1> g.; cd 'g:\Java 1\CIS36A\Lab1'; & 'C:\Program Fil
v\AppData\Roaming\Code\User\workspaceStorage\17253e159982c6379751721bb868ffcd
Age:
17
Not eligible to vote.
PS G:\Java 1\CIS36A\Lab1> 
```

6. Write a program that prints out the first 20 squares (1, 4, 9, 16,..., 400), one per line.
Use a for loop.

The screenshot shows an IDE with a dark theme. The Explorer panel on the left shows a project named 'Lab1' with several Java files. The file 'First20Squares.java' is selected. The main editor displays the code for this file, which uses a for loop to calculate and print the first 20 squares. The bottom panel shows the terminal output, which lists the squares from 1 to 400 on separate lines. The terminal prompt indicates the program was run from a PowerShell window.

```
File Edit Selection View Go Run Terminal Help First20Squares.java - Untitled (Workspace)

EXPLORER
  UNTITLED (WORKSPACE)
    > addons
    > Lab1
      exercise26.java
      exercise27.java
      facePrintOut.java
      First20Squares.java
      GalToLitTable.java
      marsGravityComparison.java
      userAge.java

Lab1 > J First20Squares.java > ...
1  public class First20Squares {
   Run | Debug
2      public static void main(String[] args) {
3          int CurrentNumber;
4          for (CurrentNumber = 1; CurrentNumber <= 20; CurrentNumber++)
5          {
6              int CurrentNumberSquared = (CurrentNumber*CurrentNumber);
7              System.out.println(CurrentNumberSquared);
8          }
9      }
10 }
11

PROBLEMS 41 OUTPUT TERMINAL JUPYTER DEBUG CONSOLE

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS G:\Java 1\CIS36A\Lab1> & 'C:\Program Files\Java\jdk-18.0.2.1\bin\java.exe' '--enable-preview' 'spaceStorage\17253e159982c6379751721bb868ffcd\redhat.java\jdt_ws\Lab1_6ebf39c2\bin' 'First20Squ
1
4
9
16
25
36
49
64
81
100
121
144
169
196
225
256
289
324
361
400
PS G:\Java 1\CIS36A\Lab1>
```


7. Write a program that prints the sum of the first 10 natural numbers ($1 + 2 + 3 + \dots + 10$).
Use an accumulator variable, **sum**, and a loop.

File Edit Selection View Go Run Terminal Help

EXPLORER

▼ UNTITLED (WORKSPACE)

> addons

▼ Lab1

- 🔥 exercise26.java
- 🔥 exercise27.java
- 🔥 facePrintOut.java
- 🔥 First10Natural.java
- 🔥 First20Squares.java
- 🔥 GalToLitTable.java
- 🔥 marsGravityComparison.java
- 🔥 userAge.java

config.cpp

🔥 exercise26.java

🔥 exercise27.java

🔥 G

Lab1 > 🔥 First10Natural.java > ...

```
1 public class First10Natural {  
    Run | Debug  
2     public static void main(String[] args) {  
3         int accumulator=0;  
4         int sum =0;  
5         while(accumulator <= 10)  
6         {  
7             accumulator = (accumulator+1);  
8             sum = (accumulator + sum);  
9             System.out.println(sum);  
10        }  
11    }  
12 }  
13
```

PROBLEMS

41

OUTPUT

TERMINAL

JUPYTER

DEBUG CONSOLE

Windows PowerShell

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Try the new cross-platform PowerShell <https://aka.ms/pscore6>

PS G:\Java 1\CIS36A\Lab1> & 'C:\Program Files\Java\jdk-18.0.2\spaceStorage\17253e159982c6379751721bb868ffcd\redhat.java\jdt_

1
3
6
10
15
21
28
36
45
55
66

PS G:\Java 1\CIS36A\Lab1>