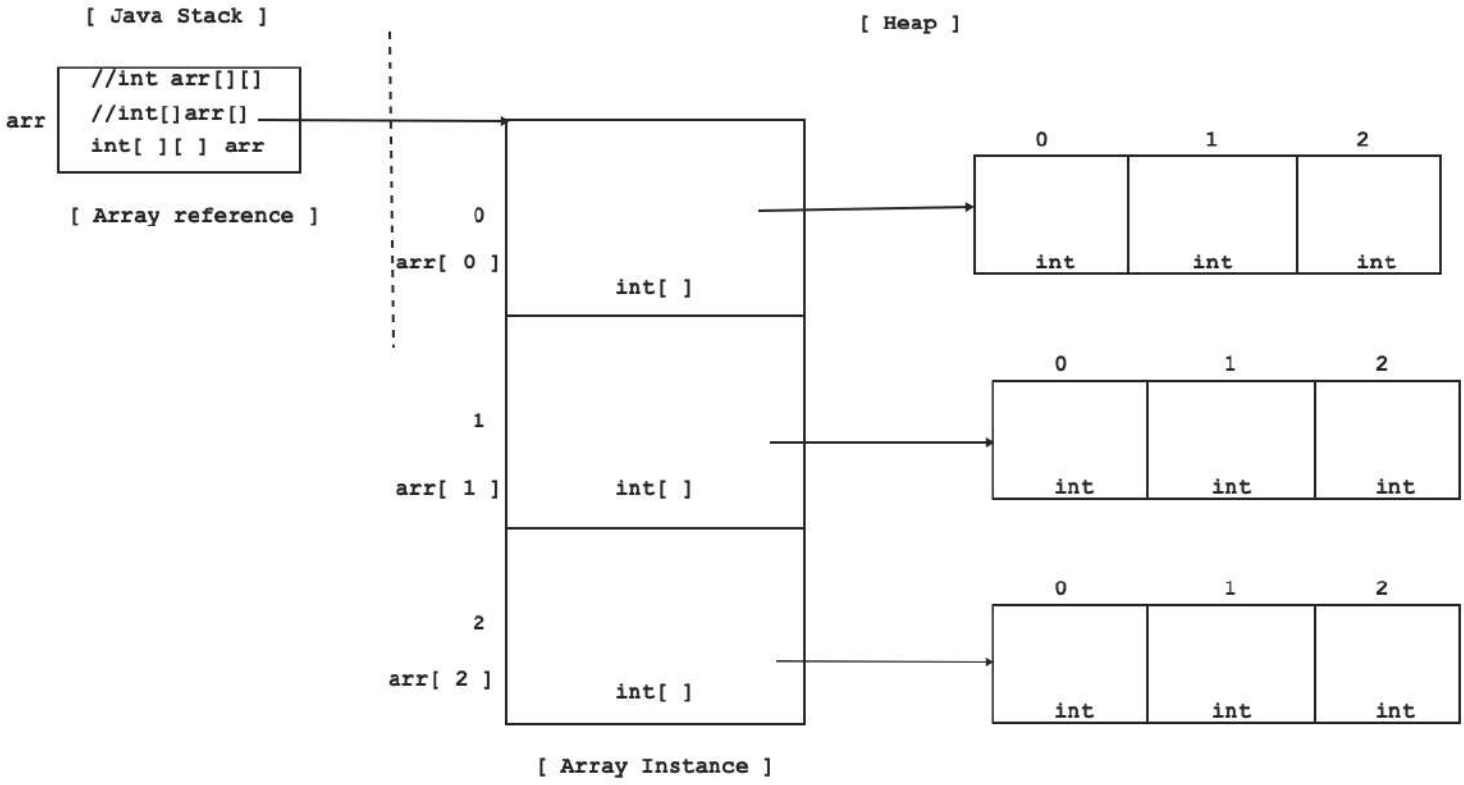
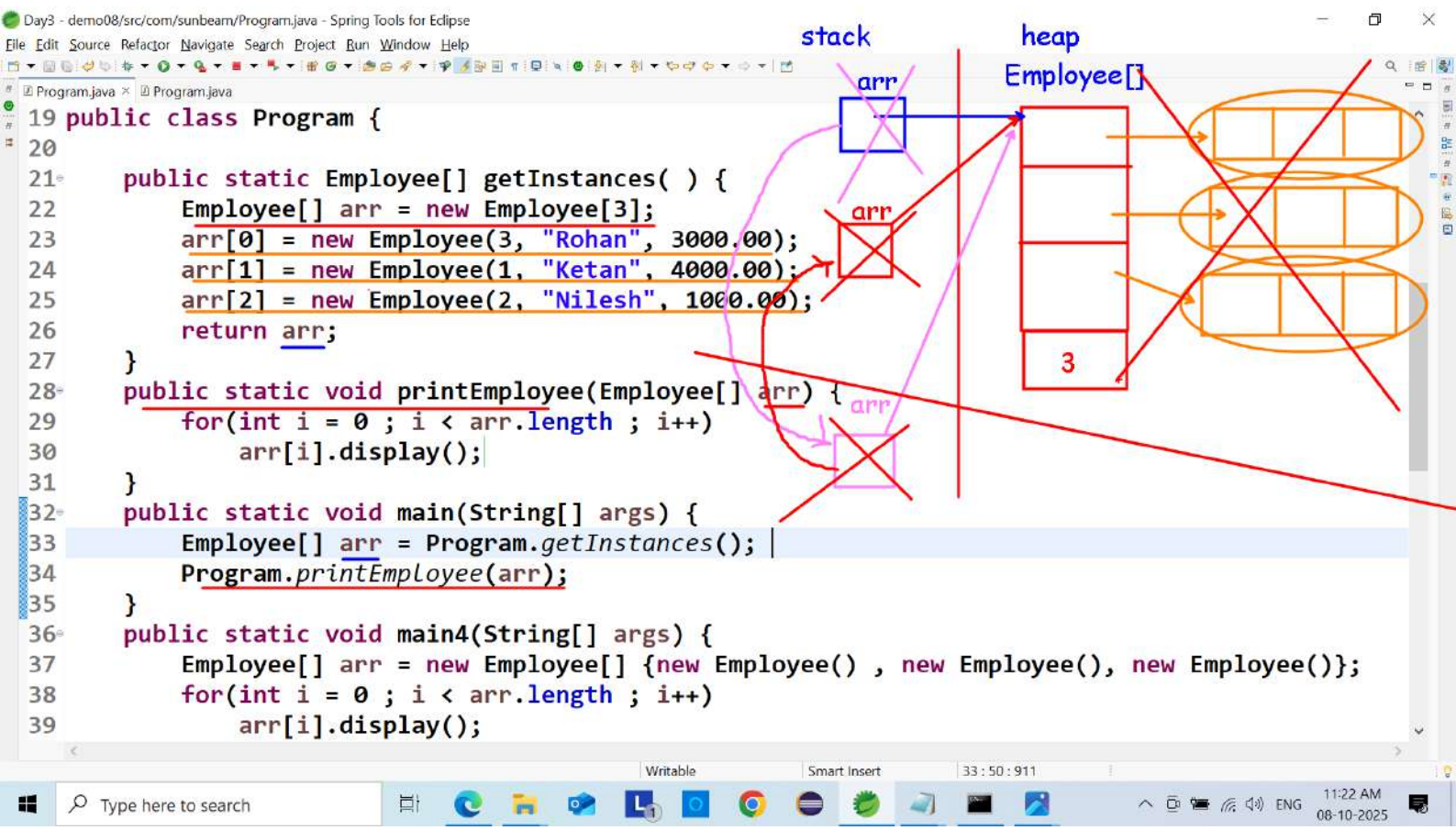



[ Multi Dimensional Array ]


Day3 - demo08/src/com/sunbeam/Program.java - Spring Tools for Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Program.java
Program.java
19 public class Program {
20
21 public static Employee[] getInstances( ) {
22 Employee[] arr = new Employee[3];
23 arr[0] = new Employee(3, "Rohan", 3000.00);
24 arr[1] = new Employee(1, "Ketan", 4000.00);
25 arr[2] = new Employee(2, "Nilesh", 1000.00);
26 return arr;
27 }
28 public static void printEmployee(Employee[] arr) {
29 for(int i = 0 ; i < arr.length ; i++)
30 arr[i].display();
31 }
32 public static void main(String[] args) {
33 Employee[] arr = Program.getInstances();
34 Program.printEmployee(arr);
35 }
36 public static void main4(String[] args) {
37 Employee[] arr = new Employee[] {new Employee() , new Employee(), new Employee()};
38 for(int i = 0 ; i < arr.length ; i++)
39 arr[i].display();
stack
heap
Employee[]
arr
arr
arr
3
Writable
Smart Insert
33 : 50 : 911
Type here to search
ENG
11:22 AM
08-10-2025

1.- If i want to give same name to the method and type of parameters are same then number of parameters must be different

```
public static void add(int a , int b){
  //TODO
}
public static void add(int a , int b, int c){
 // TODO
}
```

- If i want to give same name to the method and number of parameters are same then order of parameters must be different

```
public static void add(int a , float b){
  //TODO
}
public static void add(float a , int b){
  //TODO
}
```

2. IF i want to give same name to the method and number ofparams are same then at-least one parameter must be different

```
public static void add(int a , int b){
 // TODO
}
public static void add(int a , float b){
 //TODO
}
```

* Return type is not considered while overloading the method
* Methods which participate in overloading are called as overloaded methods |

Packages
- To avoid name conflict / ambiguity
- container -- Types ( class , enum , interface , subpackages)
- Modularity (major pillar)
- packages are written in lower case
- when compiled separate folder is created for each package

- 1D array
  - Array is reference type ( memory allocated on heap section)

```
int[] arr1 = new int[3]; // default 0 -- heap section
int[] arr2 = new int[]; {10,20,30};
int[] arr3 = {10,20,30};
```

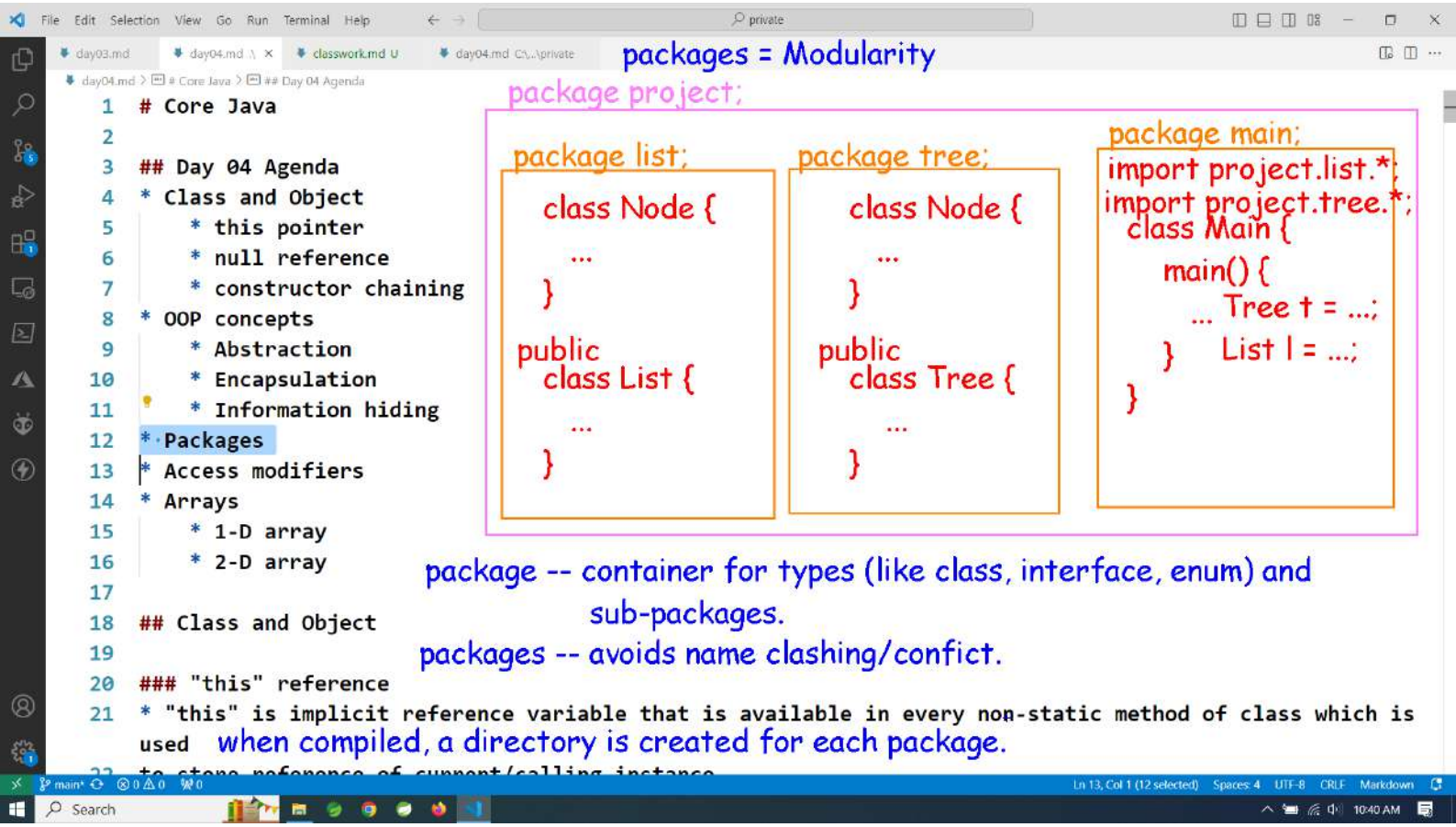
-2D array

```
int[][] arr = new int[3][3];
int[] arr[] = new int[3][3];
int arr[][] = new int[3][3];
double[][] arr = new double[][]{ {1.1,2.1,3.1} , {4.1,5.1,6.1}};
```

- Ragged array

```
int[][] rarr = new int[4][];
```

- Array of objects
  - Array of reference - by default contains null - programmers resp to init it otherwise NullPointerException
  - Arrays -- Helper class -- static methods
  - Command line argument -- Extra info passed on command line while executing the program
- Primitive types are passed by value and non primitive passed by reference
  primitive --> reference --> Array
- Method overloading
  - Number of parameters
  - Type of parameters
  - Order of parameters
- Return type is not considered while overloading , catching value is optional
- we can pass annonymous array to the method
  double r3 = arraySum(new double[]{1.1,2.1,3.1});
- variable arity method --(double ...) -- Internally Compiler will convert into array and passed to the method
- Object class reference can store the address of any type ( Object class is a super class of all the classes) |

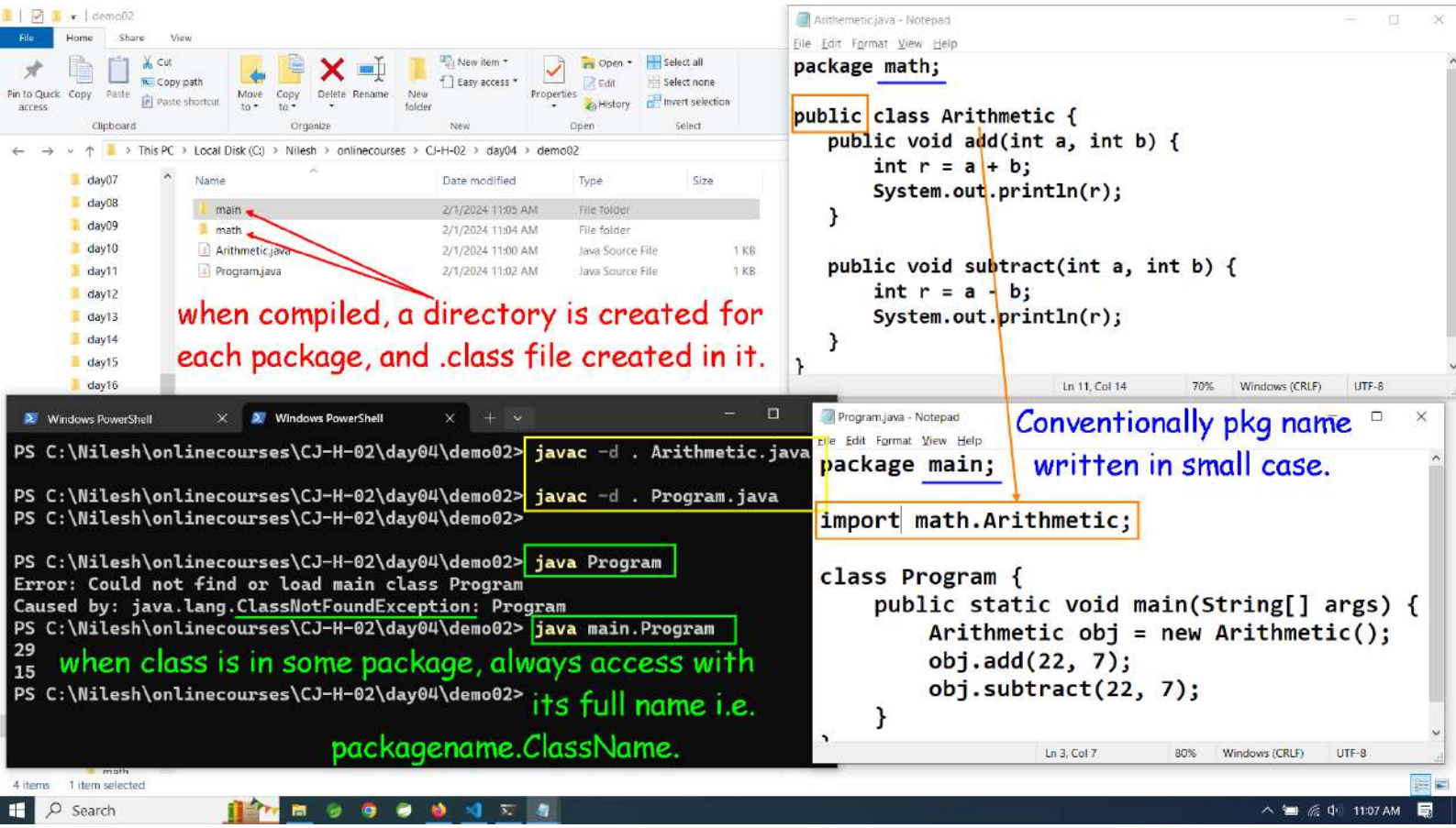



```
# Core Java

## Day 04 Agenda
* Class and Object
    * this pointer
    * null reference
    * constructor chaining
* OOP concepts
    * Abstraction
    * Encapsulation
    * Information hiding
* Packages
* Access modifiers
* Arrays
    * 1-D array
    * 2-D array

## Class and Object

### "this" reference
* "this" is implicit reference variable that is available in every non-static method of class which is used
```

package -- container for types (like class, interface, enum) and sub-packages.

packages -- avoids name clashing/confict.

when compiled, a directory is created for each package.




Arithmetic.java - Notepad

File Edit Format View Help

```
package math;

public class Arithmetic {
    public void add(int a, int b) {
        int r = a + b;
        System.out.println(r);
    }

    public void subtract(int a, int b) {
        int r = a - b;
        System.out.println(r);
    }
}
```

Ln 11, Col 14 70% Windows (CRLF) UTF-8

Windows PowerShell

```
PS C:\Nilesh\onlinecourses\CJ-H-02\day04\demo02> javac -d . Arithmetic.java

PS C:\Nilesh\onlinecourses\CJ-H-02\day04\demo02> javac -d . Program.java
PS C:\Nilesh\onlinecourses\CJ-H-02\day04\demo02>

PS C:\Nilesh\onlinecourses\CJ-H-02\day04\demo02> java Program
Error: Could not find or load main class Program
Caused by: java.lang.ClassNotFoundException: Program
PS C:\Nilesh\onlinecourses\CJ-H-02\day04\demo02> java main.Program
29
15
PS C:\Nilesh\onlinecourses\CJ-H-02\day04\demo02>
```

when class is in some package, always access with its full name i.e. packagename.ClassName.

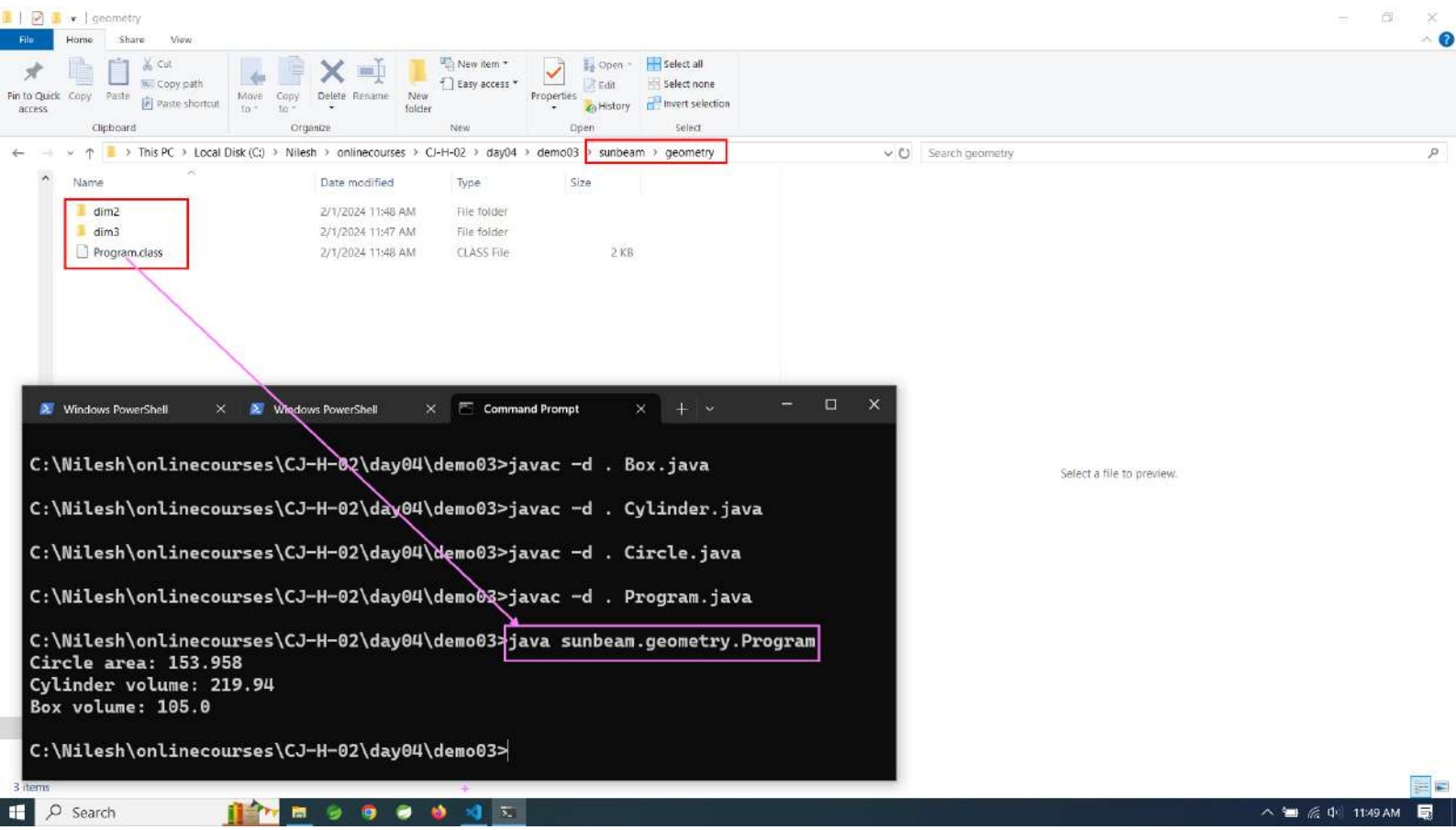
Program.java - Notepad

File Edit Format View Help

```
package main;

import math.Arithmetic;

class Program {
    public static void main(String[] args) {
        Arithmetic obj = new Arithmetic();
        obj.add(22, 7);
        obj.subtract(22, 7);
    }
}
```

Ln 3, Col 7 80% Windows (CRLF) UTF-8

Conventionally pkg name written in small case.

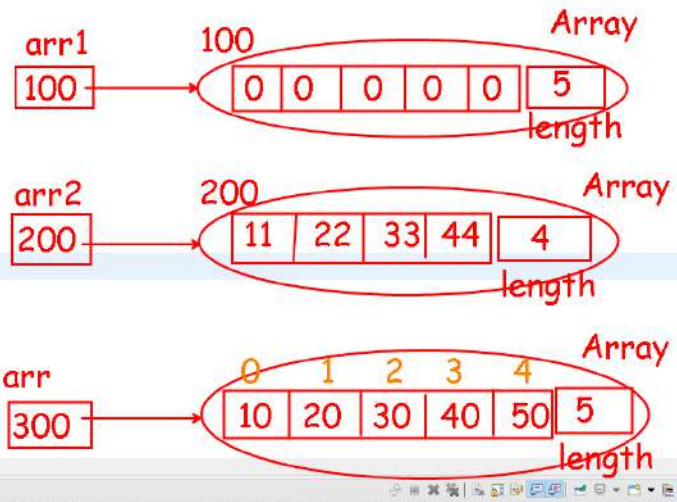

geometry
File
Home
Share
View
Pin to Quick access
Copy
Paste
Cut
Copy path
Paste shortcut
Clipboard
Move to
Copy to
Delete
Rename
Organize
New item
Easy access
New folder
New
Properties
Open
Edit
History
Open
Select all
Select none
Invert selection
Select
This PC › Local Disk (C:) › Nilesh › onlinecourses › CJ-H-02 › day04 › demo03 › sunbeam › geometry
Search geometry
Name
Date modified
Type
Size
dim2
2/1/2024 11:48 AM
File folder
dim3
2/1/2024 11:47 AM
File folder
Program.class
2/1/2024 11:48 AM
CLASS File
2 KB
Windows PowerShell
Windows PowerShell
Command Prompt
C:\Nilesh\onlinecourses\CJ-H-02\day04\demo03>javac -d . Box.java
C:\Nilesh\onlinecourses\CJ-H-02\day04\demo03>javac -d . Cylinder.java
C:\Nilesh\onlinecourses\CJ-H-02\day04\demo03>javac -d . Circle.java
C:\Nilesh\onlinecourses\CJ-H-02\day04\demo03>javac -d . Program.java
C:\Nilesh\onlinecourses\CJ-H-02\day04\demo03>java sunbeam.geometry.Program
Circle area: 153.958
Cylinder volume: 219.94
Box volume: 105.0
C:\Nilesh\onlinecourses\CJ-H-02\day04\demo03>
Select a file to preview.
3 items
Search
11:49 AM

day04 - demo05/src/com/sunbeam/Program05.java - Spring Tool Suite 4

File Edit Source Refactor Navigate Search Project Run Window Help

Program05.java

```
1  package com.sunbeam;
2
3  public class Program05 {
4      public static void main(String[] args) {
5          int[] arr1 = new int[5];
6
7          int[] arr2 = new int[] { 11, 22, 33, 44 };
8
9          int[] arr = { 10, 20, 30, 40, 50 };
10
11         for(int i=0; i < arr.length; i++)
12             System.out.println(arr[i]);
13     }
14 }
15
16
```




Problems Javadoc Declaration Console

<terminated> Program05 [Java Application] C:\Nilesh\setup\sts-4.15.1.RELEASE\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.3.v20220515-1416\jre\bin\javaw.exe (Feb 1, 2024, 12:58:05 PM – 12:58:06 PM) [pid: 16164]

```
10
20
30
40
50
```

Checking array bounds is responsibility of JVM.
If invalid index accessed, ArrayIndexOutOfBoundsException.

arr[i]
- access ith element from array
- 0 to length-1

for(int num : arr)
sysout(num);
array eles can be accessed using for each loop.

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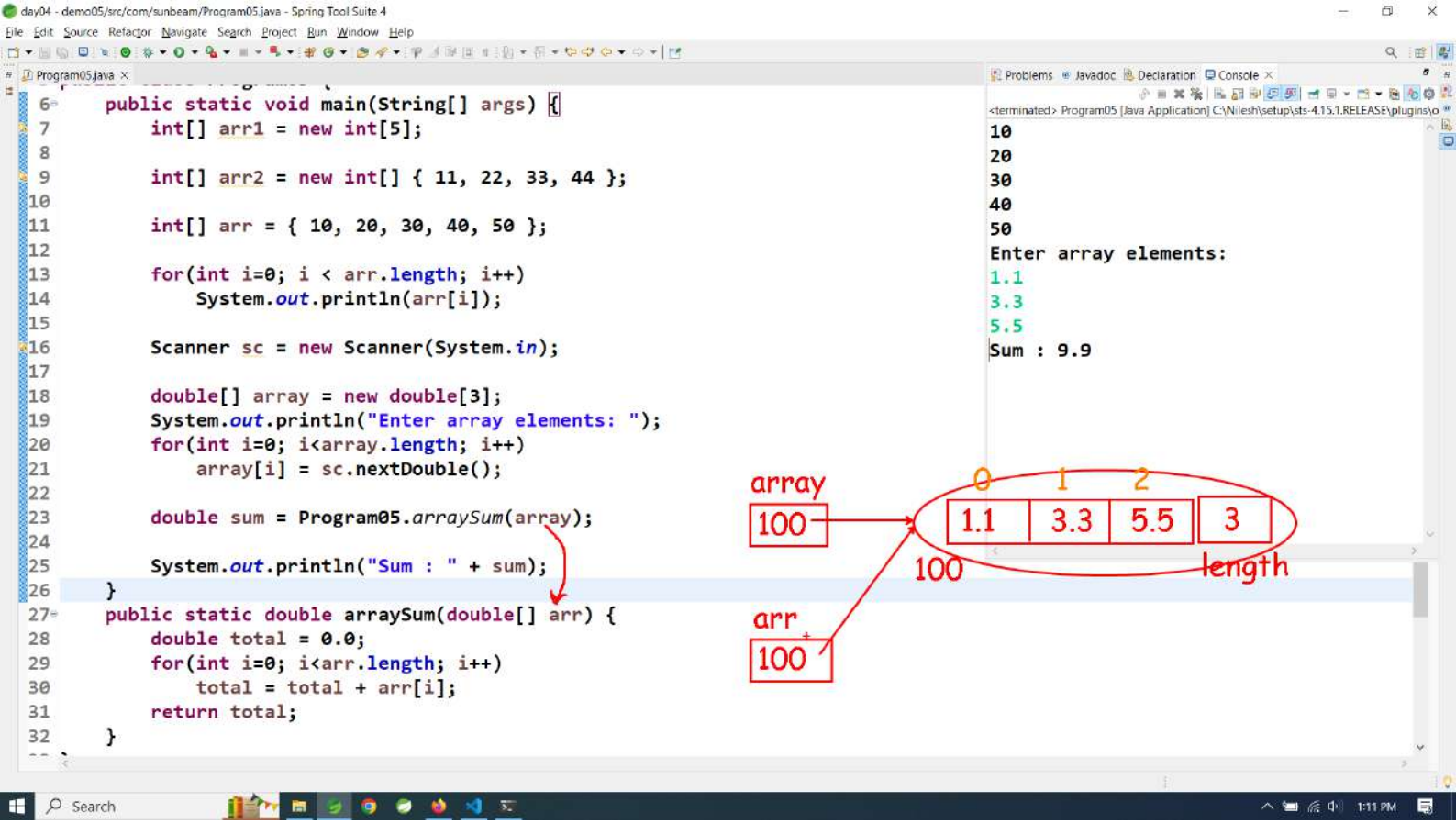
Search 12:58 PM


day04 - demo05/src/com/sunbeam/Program05.java - Spring Tool Suite 4
File Edit Source Refactor Navigate Search Project Run Window Help
Program05.java
public static void main(String[] args) {
int[] arr1 = new int[5];
int[] arr2 = new int[] { 11, 22, 33, 44 };
int[] arr = { 10, 20, 30, 40, 50 };
for(int i=0; i < arr.length; i++)
System.out.println(arr[i]);
Scanner sc = new Scanner(System.in);
double[] array = new double[3];
System.out.println("Enter array elements: ");
for(int i=0; i<array.length; i++)
array[i] = sc.nextDouble();
double sum = Program05.arraySum(array);
System.out.println("Sum : " + sum);
}
public static double arraySum(double[] arr) {
double total = 0.0;
for(int i=0; i<arr.length; i++)
total = total + arr[i];
return total;
}
Problems Javadoc Declaration Console
<terminated> Program05 [Java Application] C:\Nilesh\setup\sts-4.15.1.RELEASE\plugins\o
10
20
30
40
50
Enter array elements:
1.1
3.3
5.5
Sum : 9.9
array
100
0 1 2
1.1 3.3 5.5 3
100
length
arr
100
Search
1:11 PM