[2CEIT5PE5: MOBILE APPLICATION DEVELOPMENT]

Practical: 1

AIM-KOTLIN PROGRAMS

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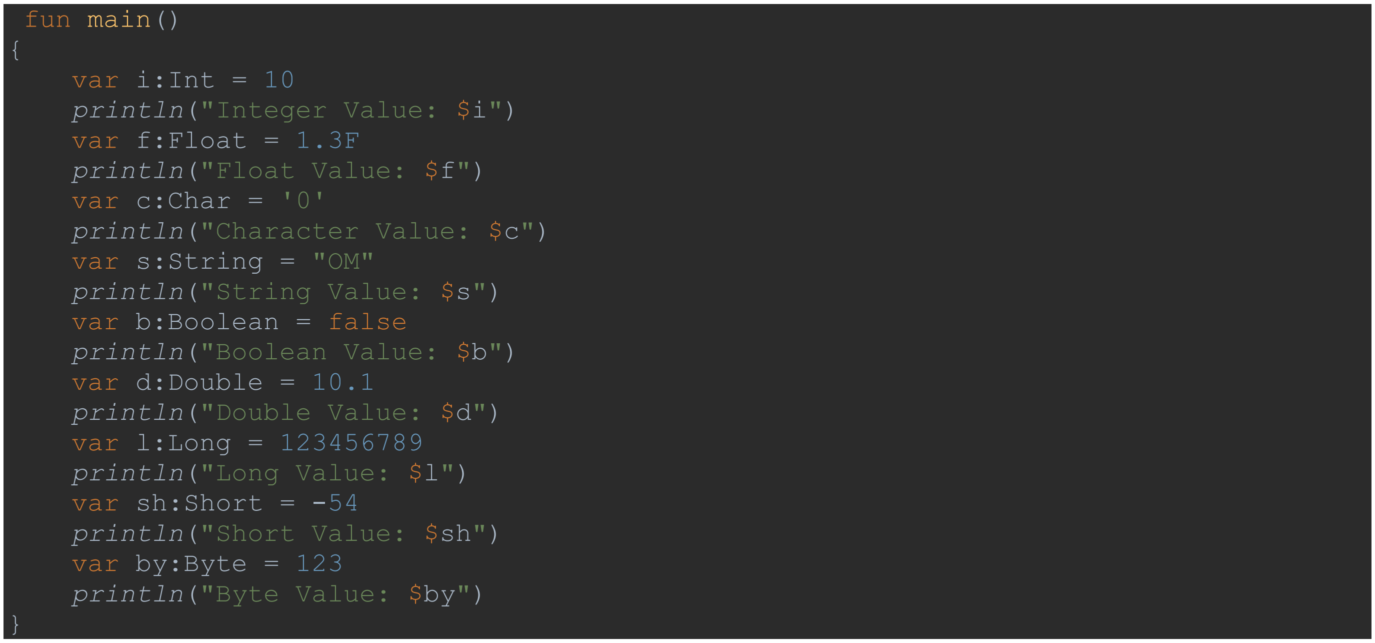
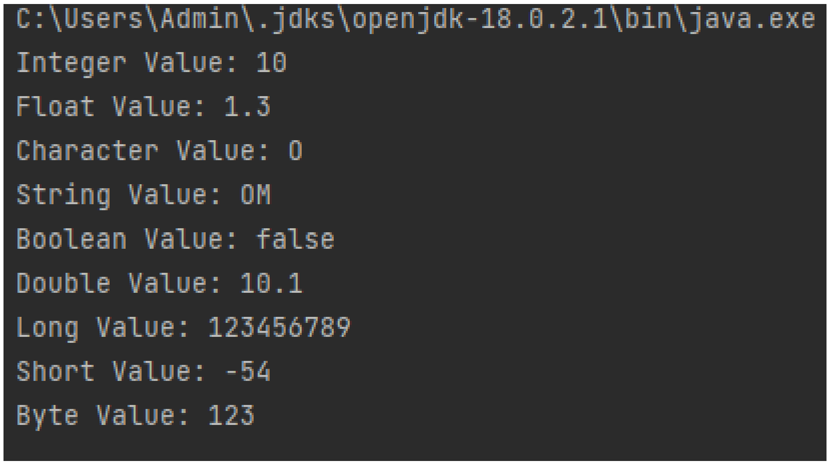
1.1. Store & Display values in different variable of different type (Integer, Double, Float, Long, Short, Byte, Char, Boolean, String)

Answer:



```
 fun main()
{
    var i:Int = 10
    println("Integer Value: $i")
    var f:Float = 1.3F
    println("Float Value: $f")
    var c:Char = '0'
    println("Character Value: $c")
    var s:String = "OM"
    println("String Value: $s")
    var b:Boolean = false
    println("Boolean Value: $b")
    var d:Double = 10.1
    println("Double Value: $d")
    var l:Long = 123456789
    println("Long Value: $l")
    var sh:Short = -54
    println("Short Value: $sh")
    var by:Byte = 123
    println("Byte Value: $by")
}
```

Output:

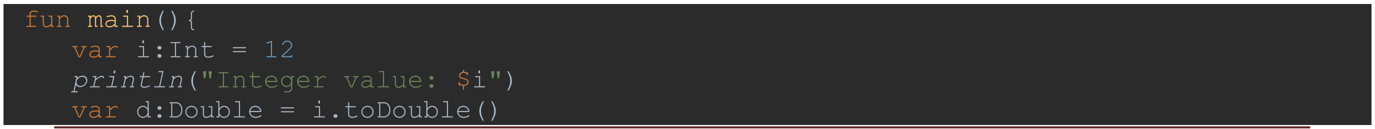


```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe
Integer Value: 10
Float Value: 1.3
Character Value: 0
String Value: OM
Boolean Value: false
Double Value: 10.1
Long Value: 123456789
Short Value: -54
Byte Value: 123
```

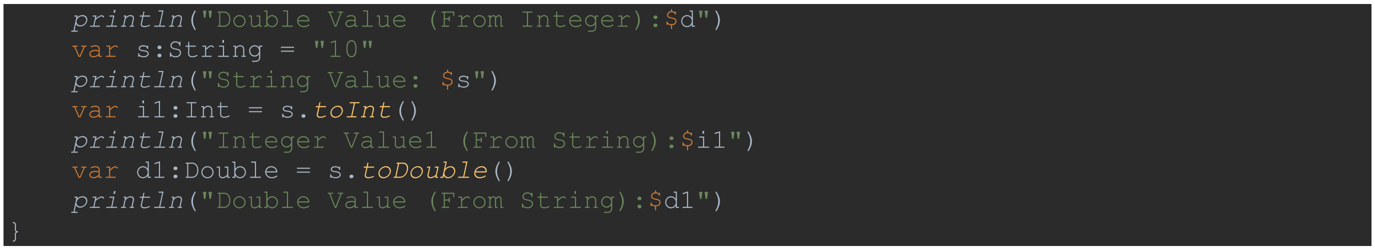
1.2. Type conversion:

Integer to Double, String to Integer, String to Double.

Answer:

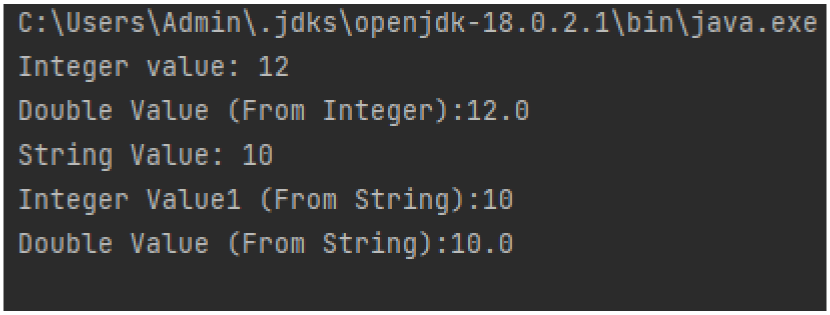


```
 fun main(){
    var i:Int = 12
    println("Integer value: $i")
    var d:Double = i.toDouble()
```



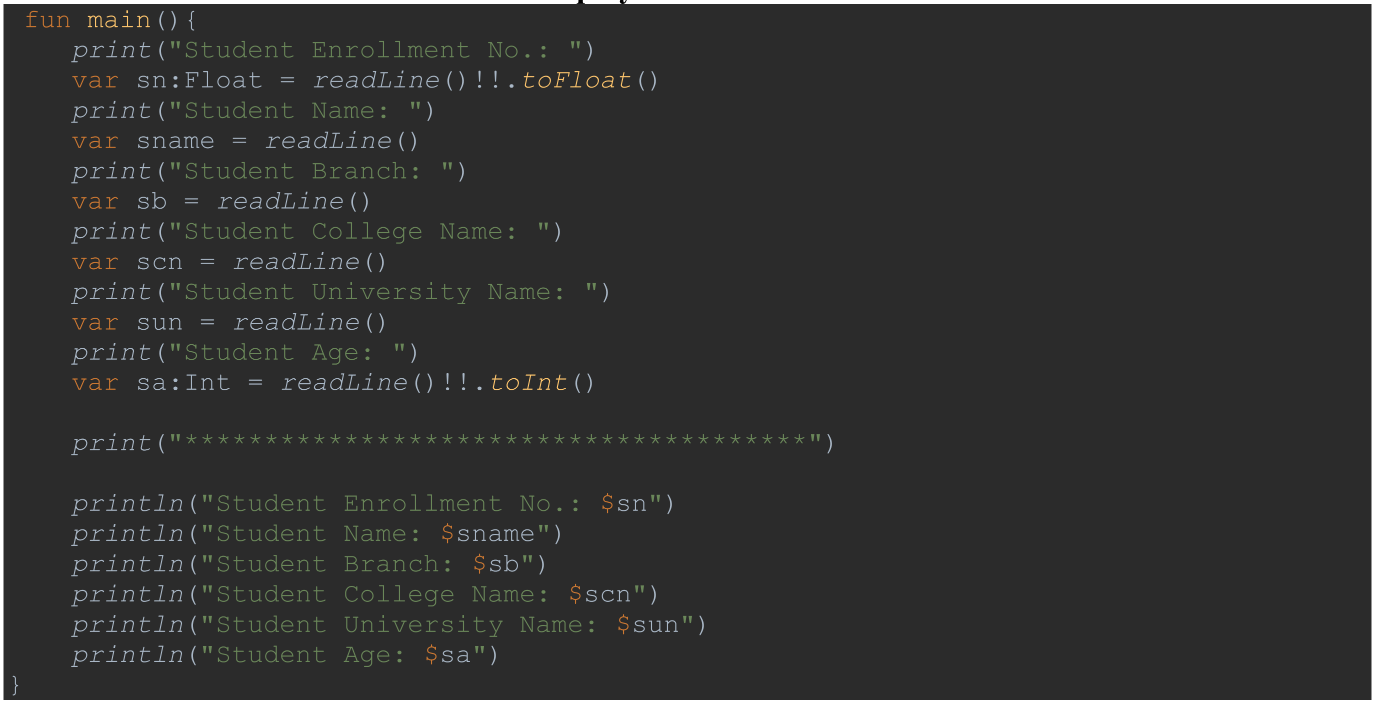
```
    println("Double Value (From Integer):$d")
    var s:String = "10"
    println("String Value: $s")
    var i1:Int = s.toInt()
    println("Integer Value1 (From String):$i1")
    var d1:Double = s.toDouble()
    println("Double Value (From String):$d1")
}
```

Output:



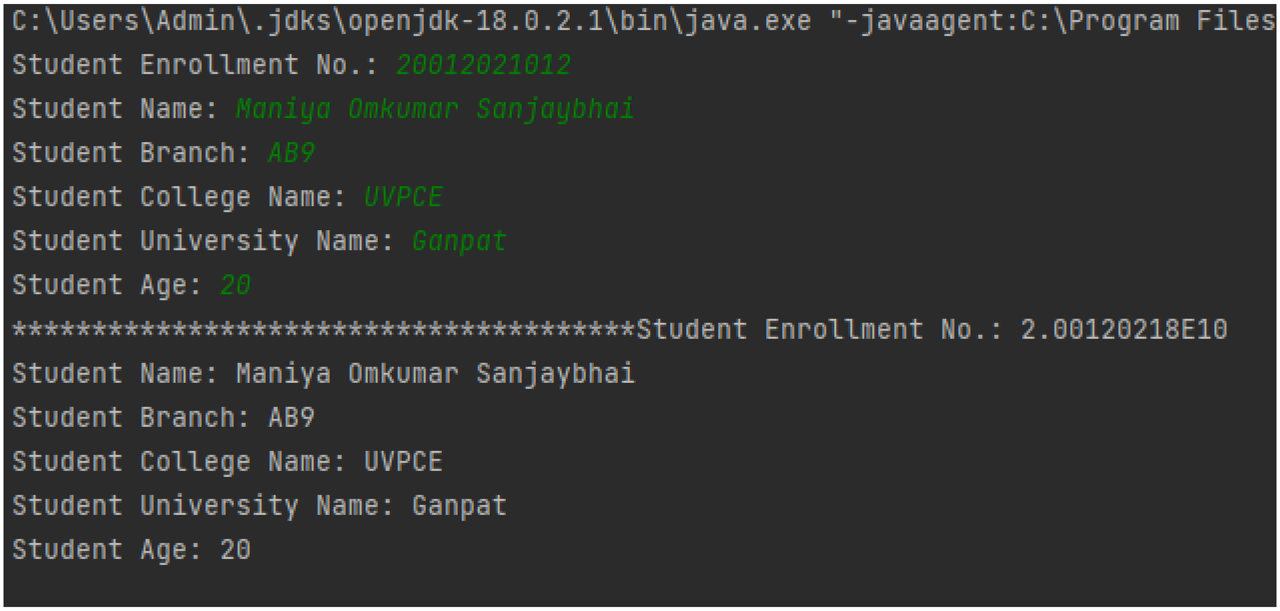
```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe
Integer value: 12
Double Value (From Integer):12.0
String Value: 10
Integer Value1 (From String):10
Double Value (From String):10.0
```

1.3. Scan student's information and display all the data.Answer:



```
 fun main(){
    print("Student Enrollment No.: ")
    var sn:Float = readLine()!!.toFloat()
    print("Student Name: ")
    var sname = readLine()
    print("Student Branch: ")
    var sb = readLine()
    print("Student College Name: ")
    var scn = readLine()
    print("Student University Name: ")
    var sun = readLine()
    print("Student Age: ")
    var sa:Int = readLine()!!.toInt()

    print("***************************************")

    println("Student Enrollment No.: $sn")
    println("Student Name: $sname")
    println("Student Branch: $sb")
    println("Student College Name: $scn")
    println("Student University Name: $sun")
    println("Student Age: $sa")
}
```

Output:



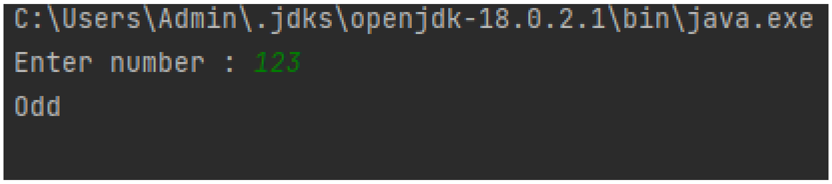
```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe "-javaagent:C:\Program Files
Student Enrollment No.: 20012021012
Student Name: Maniya Omkumar Sanjaybhai
Student Branch: AB9
Student College Name: UVPCE
Student University Name: Ganpat
Student Age: 20
***************************************Student Enrollment No.: 2.00120218E10
Student Name: Maniya Omkumar Sanjaybhai
Student Branch: AB9
Student College Name: UVPCE
Student University Name: Ganpat
Student Age: 20
```

1.4. Find the number is odd or even by using Control Flow inside println() method. Find the number is odd or even by using Control Flow inside println() method.

Answer:

```
 fun main(){
    print("Enter number : ")
    var x:Int = readLine()!!.toInt()

    if(x % 2 == 0)
        println("Even")
    else
        println("Odd")
}
```

Output:

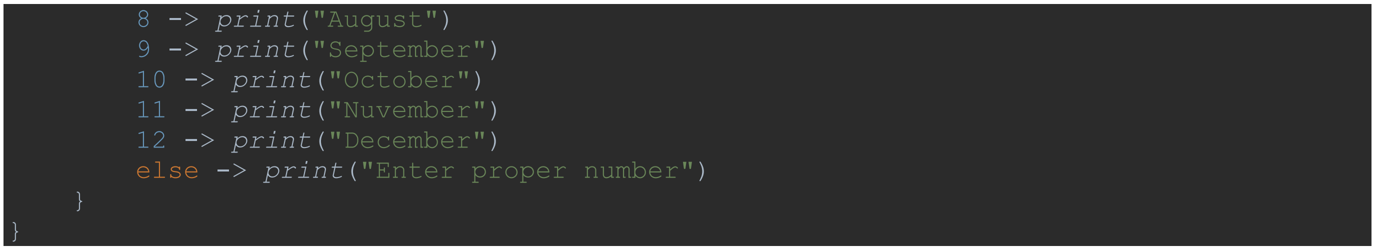


```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe
Enter number : 123
Odd
```

1.5. Display month name using When

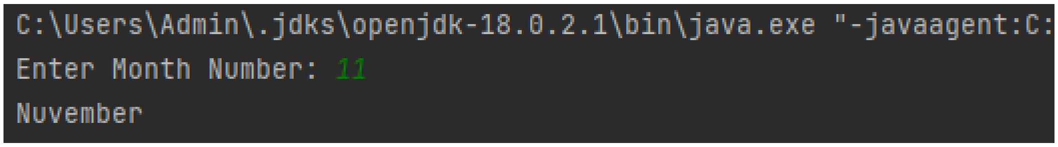
Answer:

```
 fun main(){
    print("Enter Month Number: ")
    var m:Int = readln()!!.toInt()

    when(m){
        1 -> print("January")
        2 -> print("February")
        3 -> print("March")
        4 -> print("April")
        5 -> print("May")
        6 -> print("June")
        7 -> print("July")
```



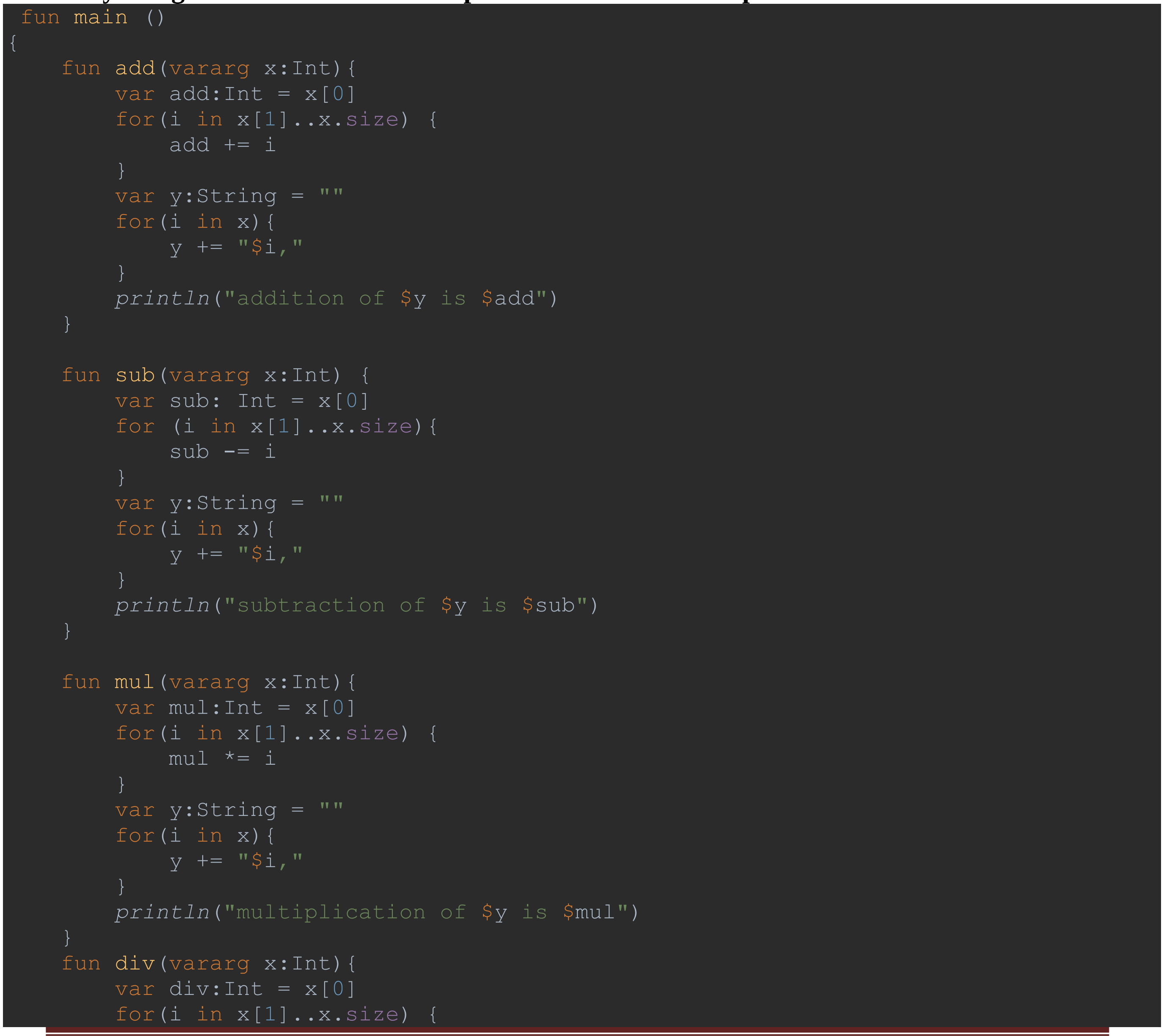
```
        8 -> print("August")
        9 -> print("September")
        10 -> print("October")
        11 -> print("Nuvember")
        12 -> print("December")
        else -> print("Enter proper number")
    }
}
```

Output:

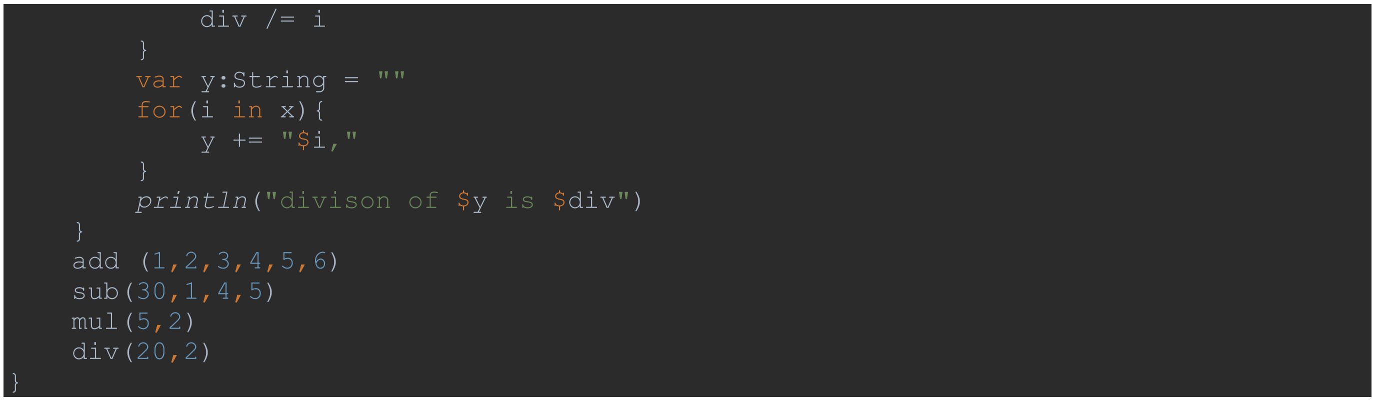


```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe "-javaagent:C:
Enter Month Number: 11
Nuvember
```

1.6. By using a user defined function perform all arithmetic operations.Answer:

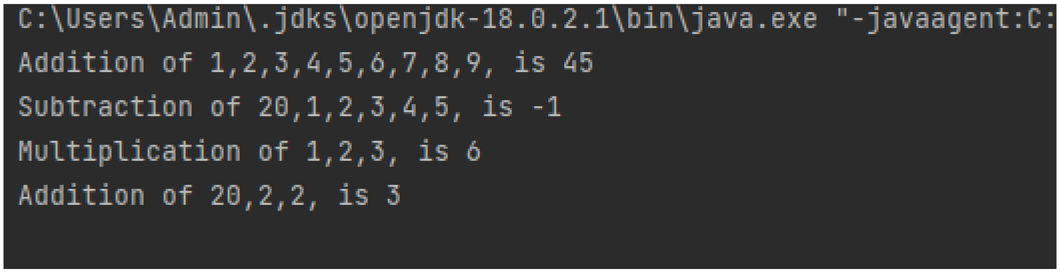


```
 fun main ()
{
    fun add(vararg x:Int){
        var add:Int = x[0]
        for(i in x[1]..x.size) {
            add += i
        }
        var y:String = ""
        for(i in x){
            y += "$i,"
        }
        println("addition of $y is $add")
    }

    fun sub(vararg x:Int) {
        var sub: Int = x[0]
        for (i in x[1]..x.size){
            sub -= i
        }
        var y:String = ""
        for(i in x){
            y += "$i,"
        }
        println("subtraction of $y is $sub")
    }

    fun mul(vararg x:Int){
        var mul:Int = x[0]
        for(i in x[1]..x.size) {
            mul *= i
        }
        var y:String = ""
        for(i in x){
            y += "$i,"
        }
        println("multiplication of $y is $mul")
    }
    fun div(vararg x:Int){
        var div:Int = x[0]
        for(i in x[1]..x.size) {
```



```
            div /= i
        }
        var y:String = ""
        for(i in x){
            y += "$i,"
        }
        println("divison of $y is $div")
    }
    add (1,2,3,4,5,6)
    sub(30,1,4,5)
    mul(5,2)
    div(20,2)
}
```

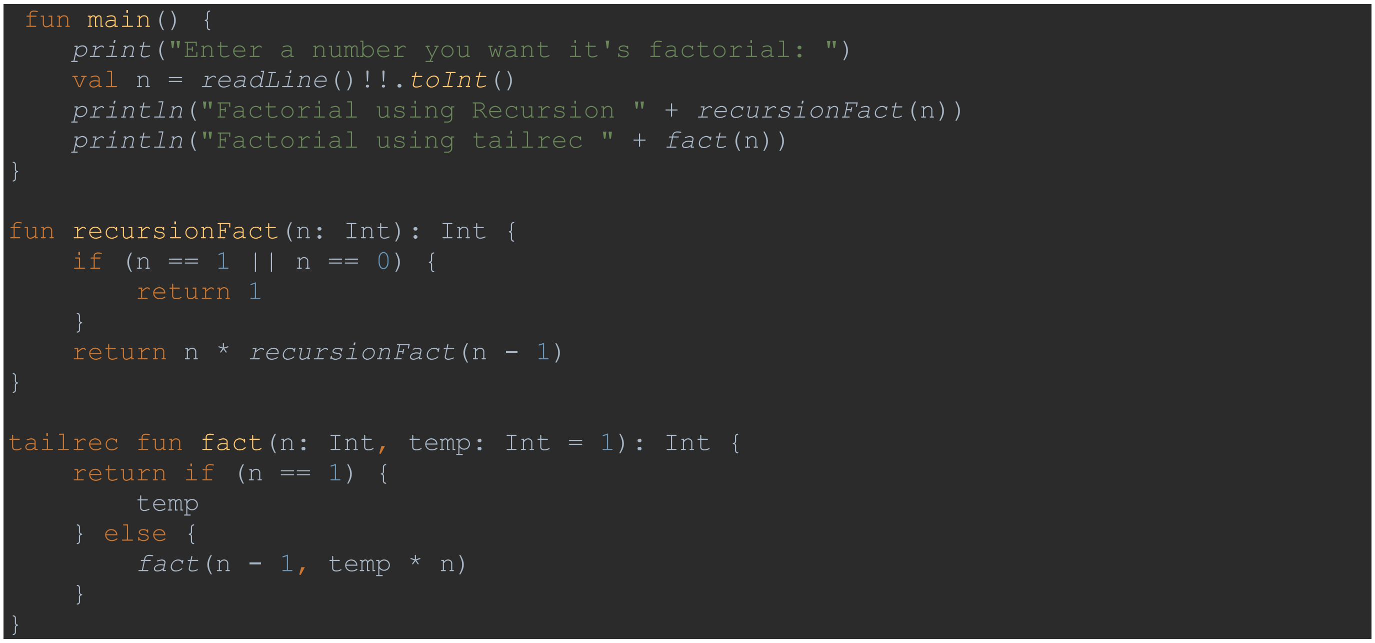
Output:



```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe "-javaagent:C:
Addition of 1,2,3,4,5,6,7,8,9, is 45
Subtraction of 20,1,2,3,4,5, is -1
Multiplication of 1,2,3, is 6
Addition of 20,2,2, is 3
```

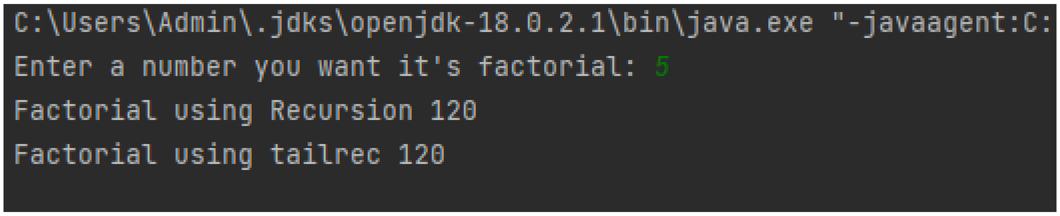
1.7. Find the factorial of number by recursion. Explain "tailrec" keyword.

Answer:



```
 fun main() {
    print("Enter a number you want it's factorial: ")
    val n = readLine()!!.toInt()
    println("Factorial using Recursion " + recursionFact(n))
    println("Factorial using tailrec " + fact(n))
}

fun recursionFact(n: Int): Int {
    if (n == 1 || n == 0) {
        return 1
    }
    return n * recursionFact(n - 1)
}

tailrec fun fact(n: Int, temp: Int = 1): Int {
    return if (n == 1) {
        temp
    } else {
        fact(n - 1, temp * n)
    }
}
```

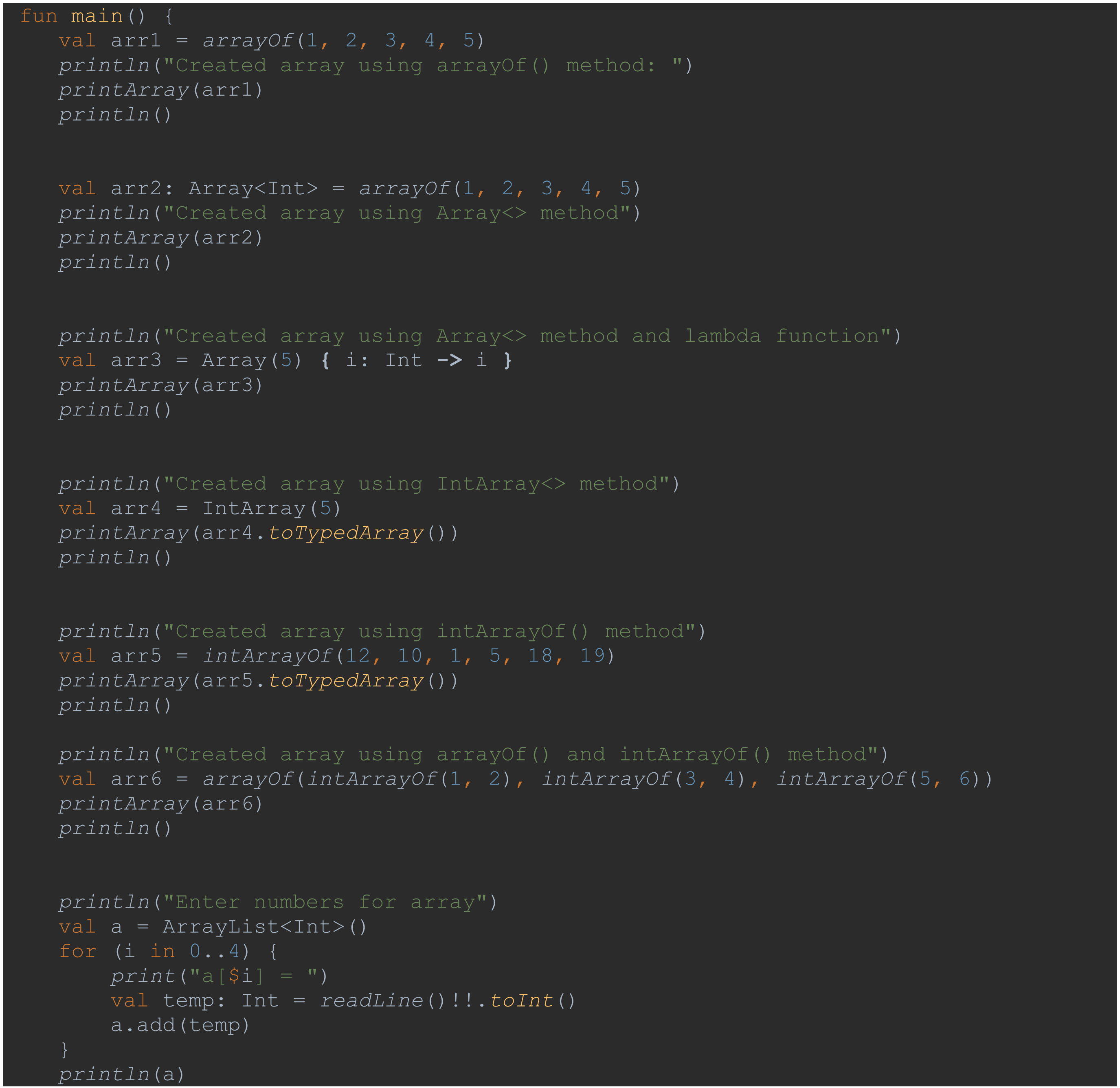
Output:



```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe "-javaagent:C:
Enter a number you want it's factorial: 5
Factorial using Recursion 120
Factorial using tailrec 120
```

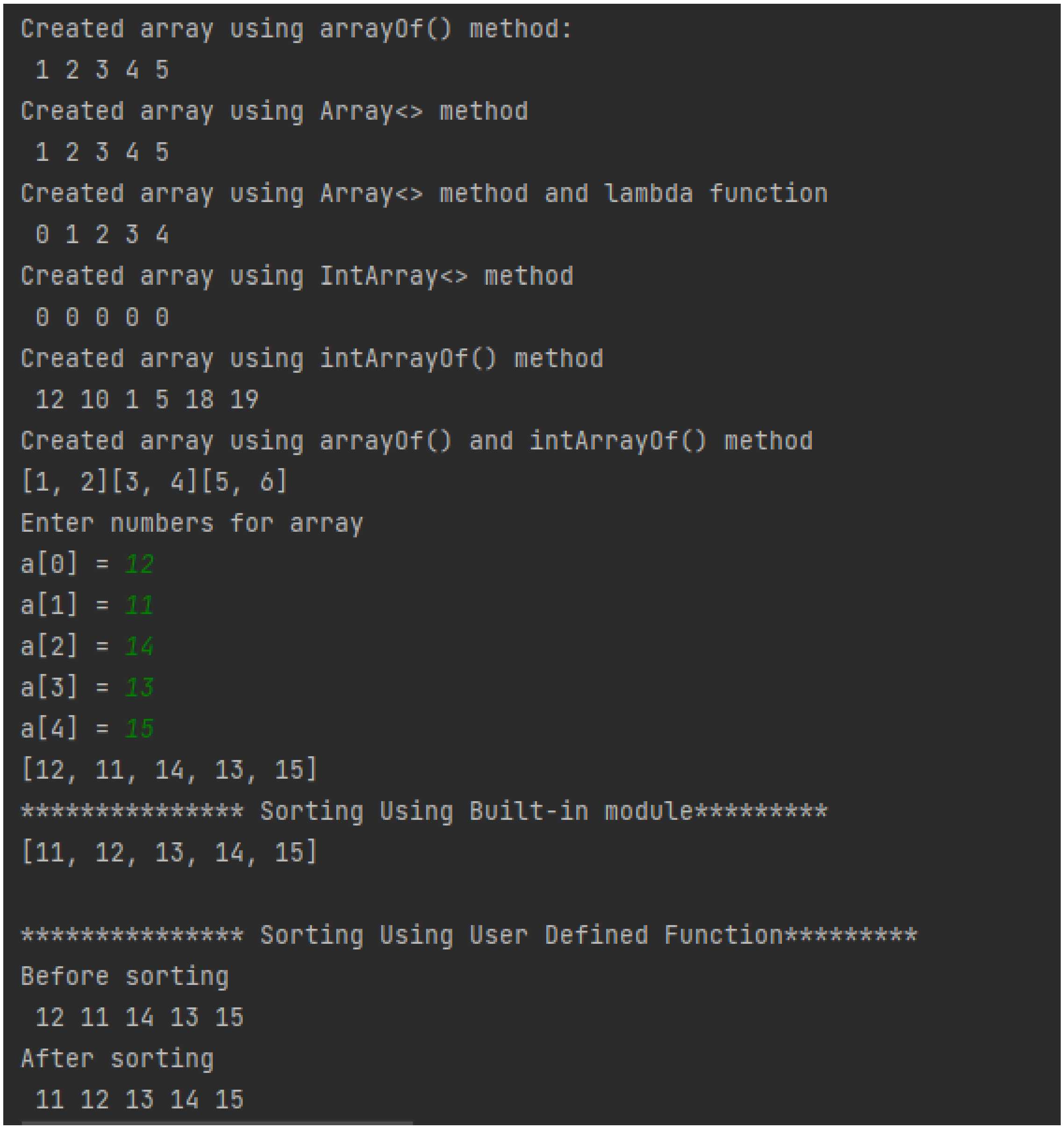
1.8. Create different types of Array as shown in image. Explore Arrays.deepToString(), contentDeepToString() methods, IntArray variable .joinToString() and use in program to print Array. Explore range, downTo, until etc. for loop and use in this program. Sort Array of Integer data type without using inbuilt function & with using inbuilt function

Answer:



```
fun main() {
    val arr1 = arrayOf(1, 2, 3, 4, 5)
    println("Created array using arrayOf() method: ")
    printArray(arr1)
    println()


    val arr2: Array<Int> = arrayOf(1, 2, 3, 4, 5)
    println("Created array using Array<> method")
    printArray(arr2)
    println()


    println("Created array using Array<> method and lambda function")
    val arr3 = Array(5) { i: Int -> i }
    printArray(arr3)
    println()


    println("Created array using IntArray<> method")
    val arr4 = IntArray(5)
    printArray(arr4.toTypedArray())
    println()


    println("Created array using intArrayOf() method")
    val arr5 = intArrayOf(12, 10, 1, 5, 18, 19)
    printArray(arr5.toTypedArray())
    println()

    println("Created array using arrayOf() and intArrayOf() method")
    val arr6 = arrayOf(intArrayOf(1, 2), intArrayOf(3, 4), intArrayOf(5, 6))
    printArray(arr6)
    println()


    println("Enter numbers for array")
    val a = ArrayList<Int>()
    for (i in 0..4) {
        print("a[$i] = ")
        val temp: Int = readLine()!!.toInt()
        a.add(temp)
    }
    println(a)
    println("*************** Sorting Using Built-in module*********")
    var c = ArrayList<Int>()
    c = a.clone() as ArrayList<Int>
    c.sort()
    println(c)
    println()

    println("*************** Sorting Using User Defined Function*********")
    println("Before sorting")
    printArray(a.toTypedArray())
    var b = ArrayList<Int>()
    b = sortArray(a)
    println()
    println("After sorting")
    printArray(b.toTypedArray())
}

fun printArray(arr: Array<Int>) {
    for (element in arr) {
        print(" $element")
    }
}


fun printArray(arr: Array<IntArray>) {
    for (row in arr) {
        print(row.contentToString())
    }
}

fun sortArray(arr: ArrayList<Int>): ArrayList<Int> {

    var i: Int
    var tmp: Int
    for (i in 0 until arr.size) {
        for (j in i + 1 until arr.size) {
            if (arr[j] < arr[i]) {
                tmp = arr[i]
                arr[i] = arr[j]
                arr[j] = tmp
            }

        }
    }

    return arr
}
```

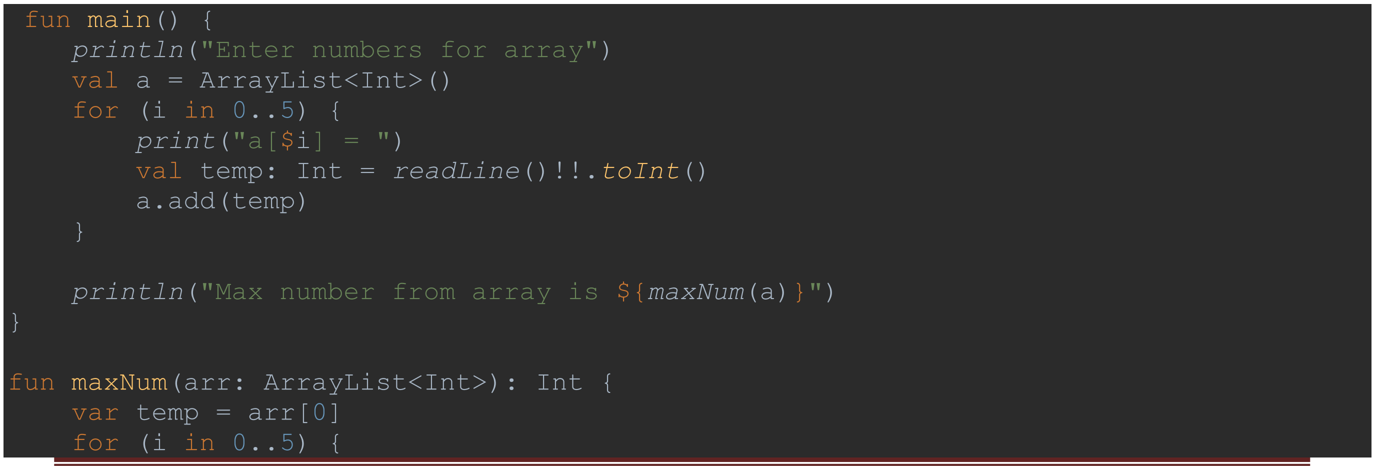
Output:



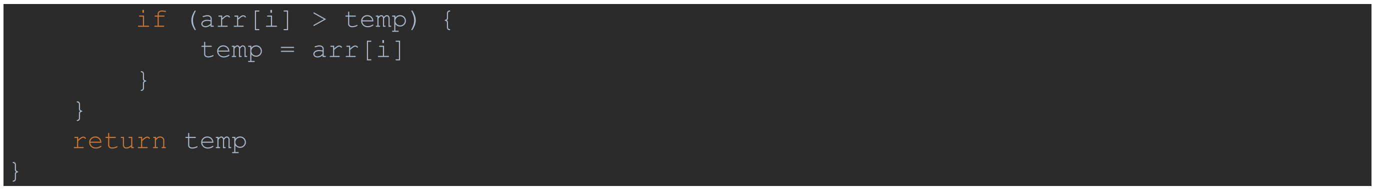
```
Created array using arrayOf() method:
 1 2 3 4 5
Created array using Array<> method
 1 2 3 4 5
Created array using Array<> method and lambda function
 0 1 2 3 4
Created array using IntArray<> method
 0 0 0 0 0
Created array using intArrayOf() method
 12 10 1 5 18 19
Created array using arrayOf() and intArrayOf() method
[1, 2][3, 4][5, 6]
Enter numbers for array
a[0] = 12
a[1] = 11
a[2] = 14
a[3] = 13
a[4] = 15
[12, 11, 14, 13, 15]
*************** Sorting Using Built-in module*********
[11, 12, 13, 14, 15]

*************** Sorting Using User Defined Function*********
Before sorting
 12 11 14 13 15
After sorting
 11 12 13 14 15
```

1.9. Find the max number from ArrayList.

Answer:

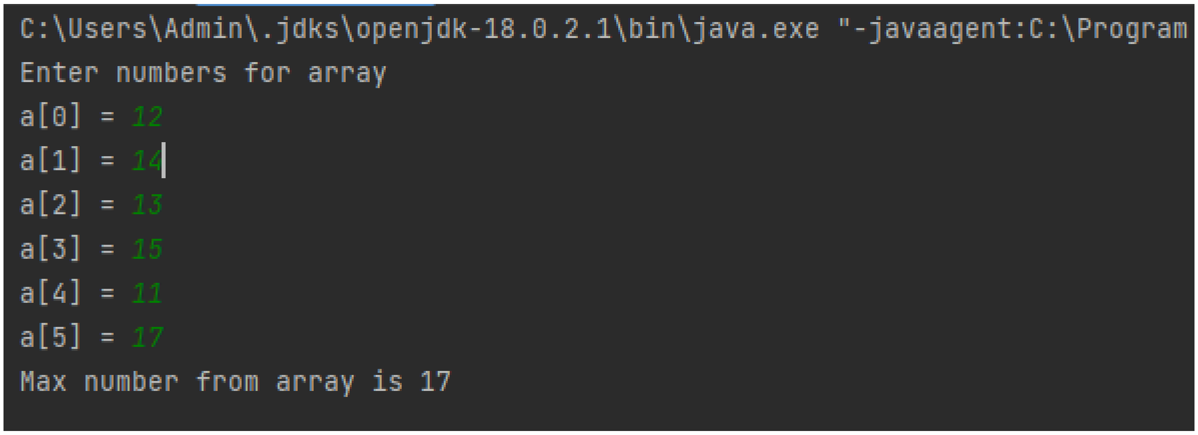


```
 fun main() {
    println("Enter numbers for array")
    val a = ArrayList<Int>()
    for (i in 0..5) {
        print("a[$i] = ")
        val temp: Int = readLine()!!.toInt()
        a.add(temp)
    }

    println("Max number from array is ${maxNum(a)}")
}

fun maxNum(arr: ArrayList<Int>): Int {
    var temp = arr[0]
    for (i in 0..5) {
```



```
        if (arr[i] > temp) {
            temp = arr[i]
        }
    }
    return temp
}
```

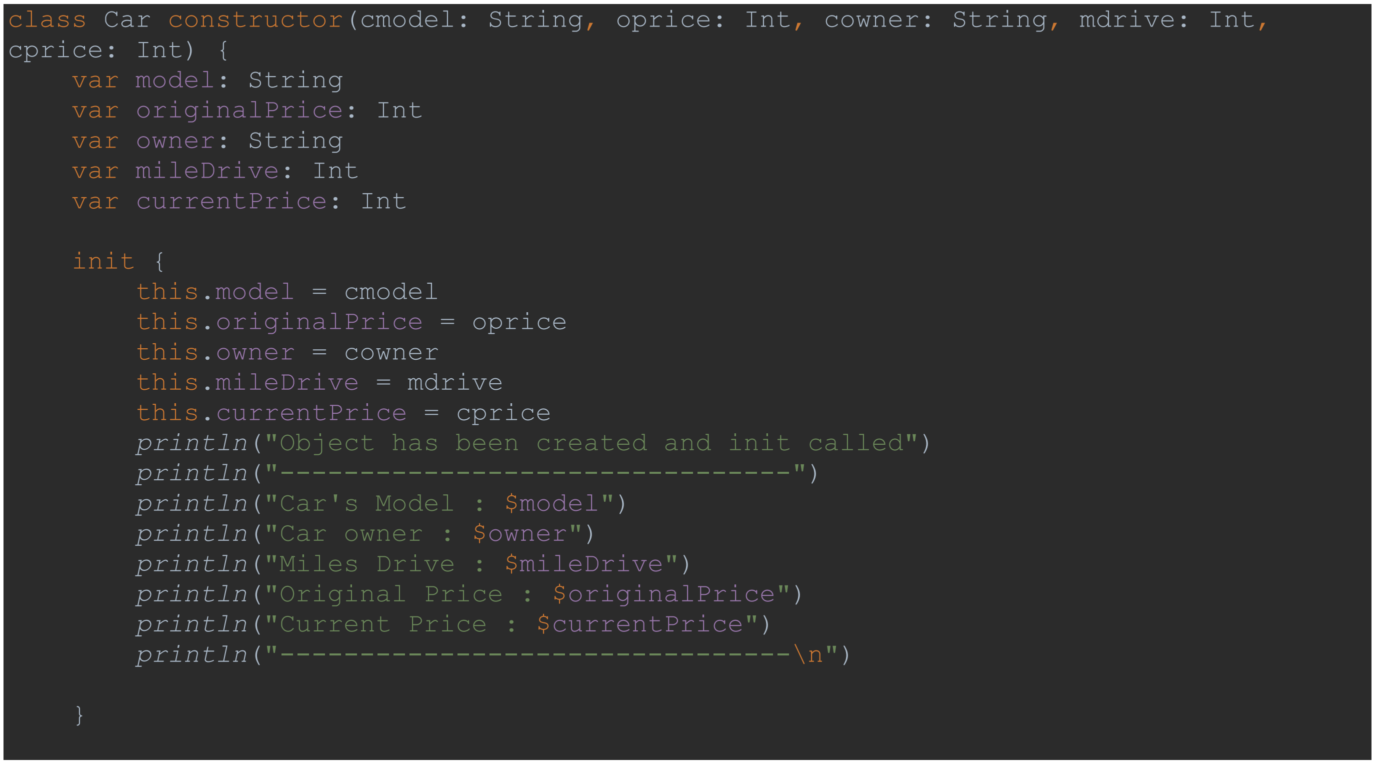
Output:



```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe "-javaagent:C:\Program
Enter numbers for array
a[0] = 12
a[1] = 14
a[2] = 13
a[3] = 15
a[4] = 11
a[5] = 17
Max number from array is 17
```

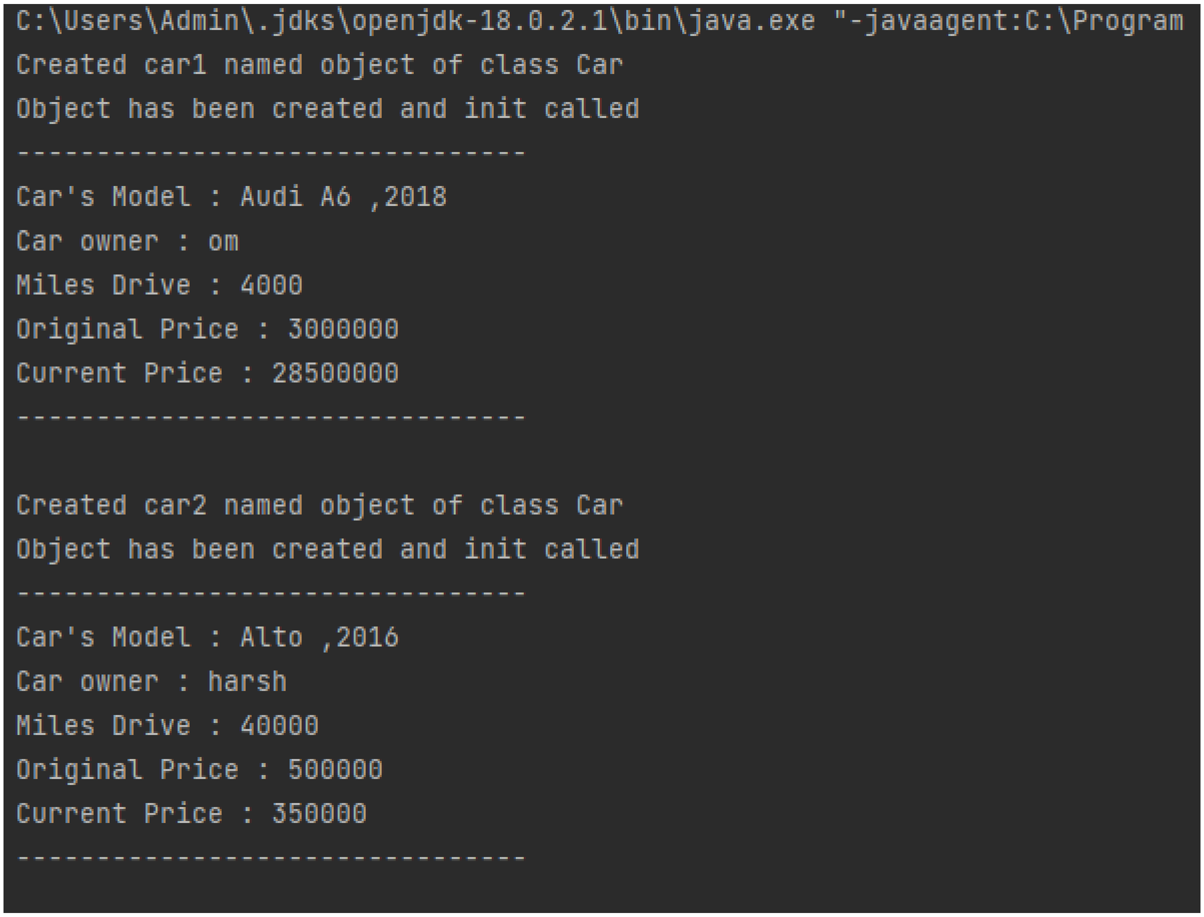
1.10. Write Different types of Class & Constructor. Create a class Car and set various members like type, model, price, owner, milesDrive. add the function getCarPrice in it. Create an object of Car class and access property of it. (getCarInformation(), getOriginalCarPrice(), getCurrentCarPrice(), displayCarInfo() etc.)

Answer:



```
class Car constructor(cmodel: String, oprice: Int, cowner: String, mdrive: Int,
cprice: Int) {
    var model: String
    var originalPrice: Int
    var owner: String
    var mileDrive: Int
    var currentPrice: Int

    init {
        this.model = cmodel
        this.originalPrice = oprice
        this.owner = cowner
        this.mileDrive = mdrive
        this.currentPrice = cprice
        println("Object has been created and init called")
        println("--------------------------------")
        println("Car's Model : $model")
        println("Car owner : $owner")
        println("Miles Drive : $mileDrive")
        println("Original Price : $originalPrice")
        println("Current Price : $currentPrice")
        println("--------------------------------\n")

    }
    fun getCarInformation() {
        println("Car's Model : $model")
    }

    fun carOwner() {
        println("Car owner : $owner")
    }

    fun mileDrove() {
        println("Miles Drive : $mileDrive")
    }

    fun getOriginalCarPrice() {
        println("Original Price : $originalPrice")
    }

    fun getCurrentCarPrice() {
        println("Current Price : $currentPrice")
    }

    fun displayCarInfo() {
        getCarInformation()
        carOwner()
        mileDrove()
        getOriginalCarPrice()
        getCurrentCarPrice()
    }


}

fun main() {
    println("Created car1 named object of class Car")
    var car1 = Car("Audi A6 ,2018", 3000000, "om", 4000, 28500000)

    println("Created car2 named object of class Car")
    var car2 = Car("Alto ,2016", 500000, "harsh", 40000, 350000)



}
```

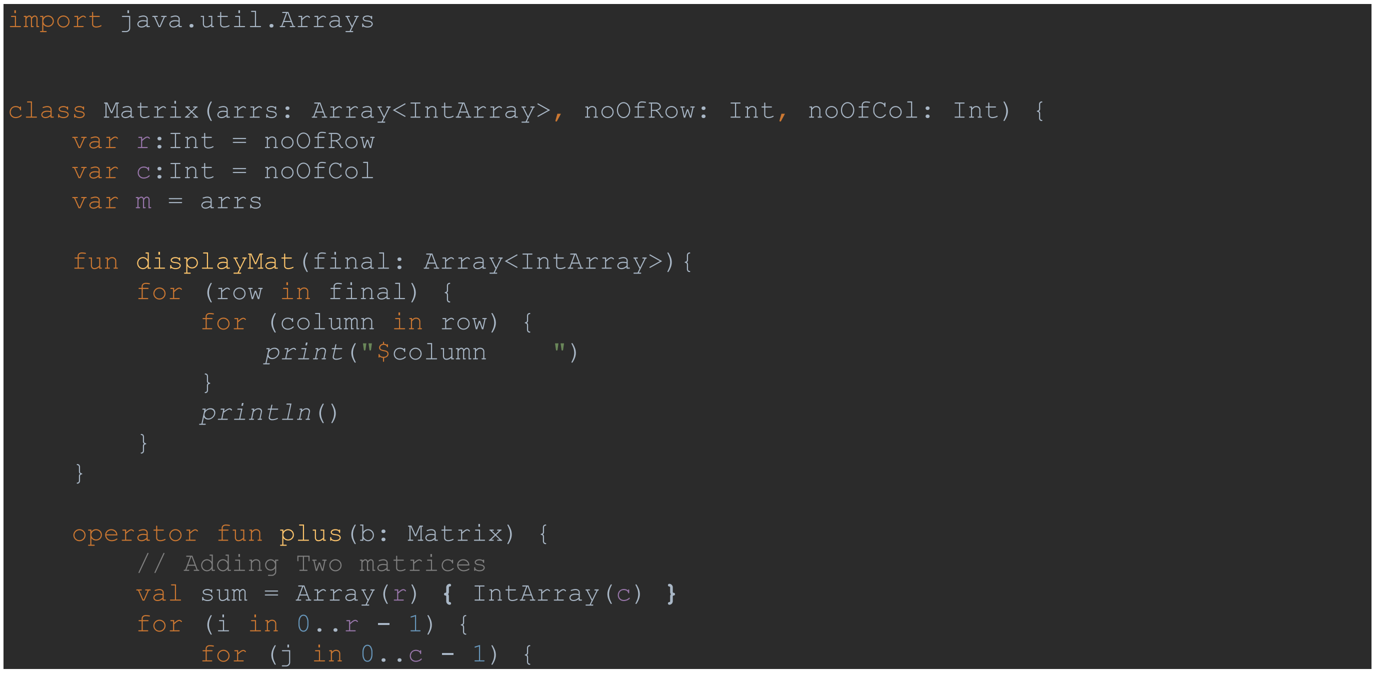
Output:



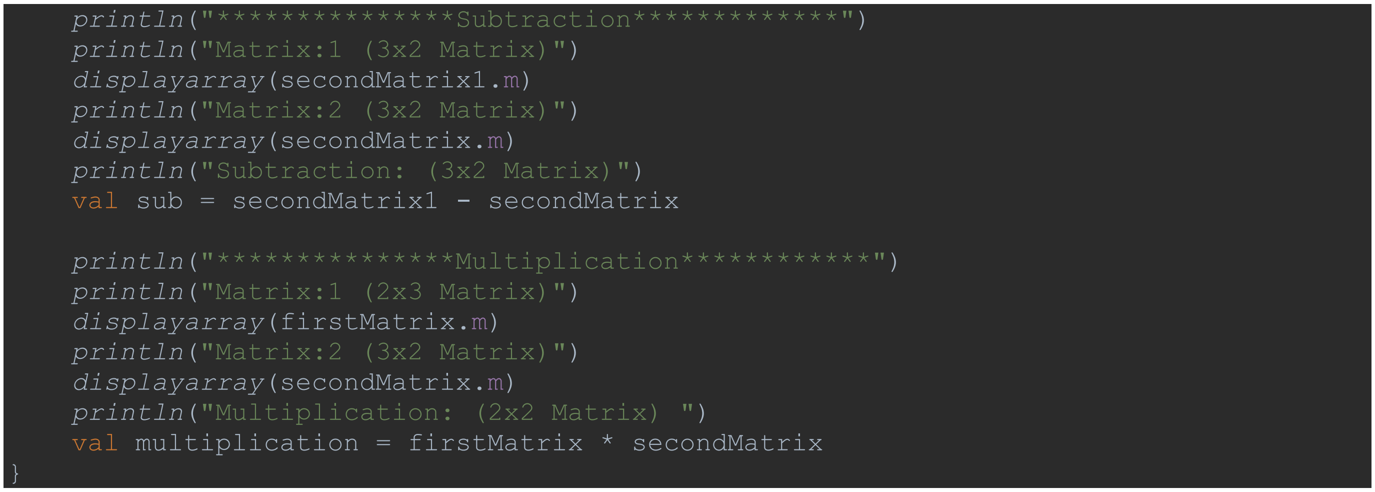
```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe "-javaagent:C:\Program
Created car1 named object of class Car
Object has been created and init called
--------------------------------
Car's Model : Audi A6 ,2018
Car owner : om
Miles Drive : 4000
Original Price : 3000000
Current Price : 28500000
--------------------------------

Created car2 named object of class Car
Object has been created and init called
--------------------------------
Car's Model : Alto ,2016
Car owner : harsh
Miles Drive : 40000
Original Price : 500000
Current Price : 350000
--------------------------------
```

1.11. Write about Operator Overloading. Perform Matrix Addition, Subtraction & Multiplication using Class Matrix & operator overloading. Overload toString() function in Matrix class.

Answer:

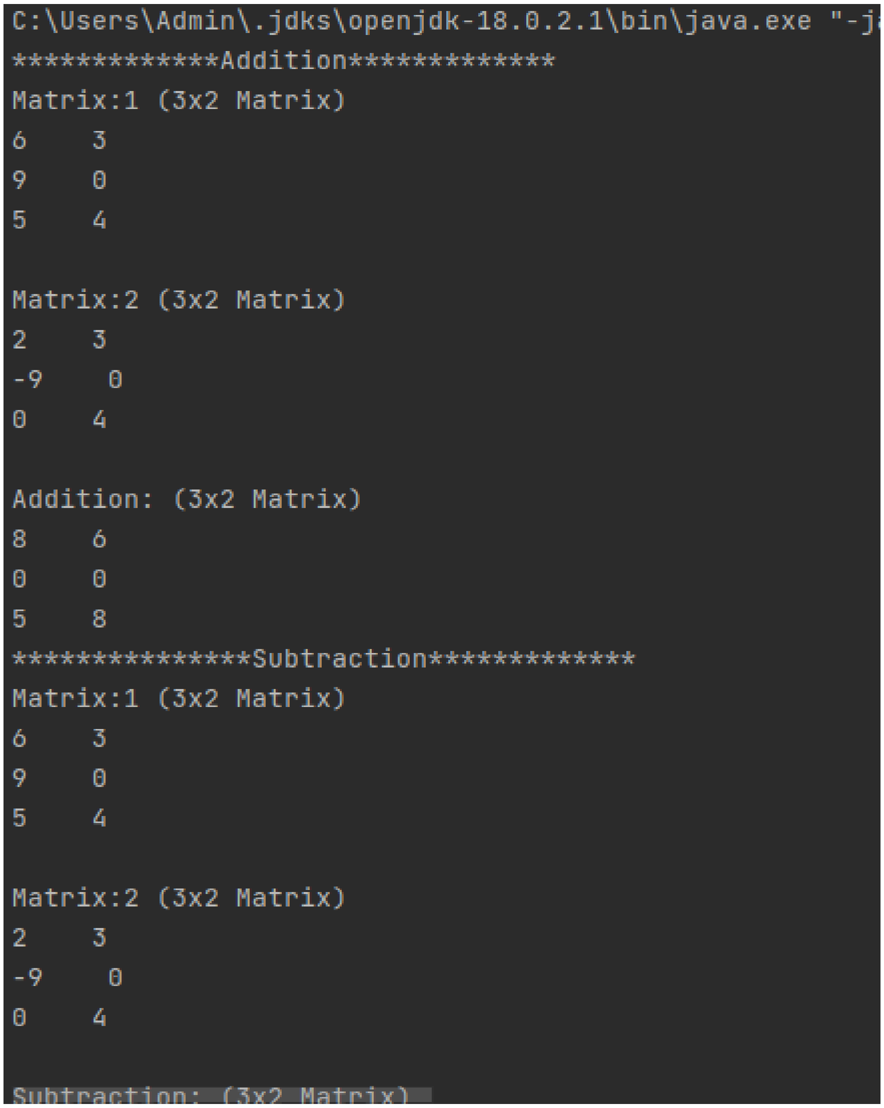


```
import java.util.Arrays


class Matrix(arrs: Array<IntArray>, noOfRow: Int, noOfCol: Int) {
    var r:Int = noOfRow
    var c:Int = noOfCol
    var m = arrs

    fun displayMat(final: Array<IntArray>){
        for (row in final) {
            for (column in row) {
                print("$column    ")
            }
            println()
        }
    }

    operator fun plus(b: Matrix) {
        // Adding Two matrices
        val sum = Array(r) { IntArray(c) }
        for (i in 0..r - 1) {
            for (j in 0..c - 1) {
                sum[i][j] = m[i][j] + b.m[i][j]
            }
        }
        return displayMat(sum)
    }

    operator fun minus(b: Matrix) {
        // Subtracting Two matrices
        val sub = Array(r) { IntArray(c) }
        for (i in 0..r - 1) {
            for (j in 0..c - 1) {
                sub[i][j] = m[i][j] - b.m[i][j]
            }
        }
        return displayMat(sub)
    }

    operator fun times(b: Matrix) {
        // Subtracting Two matrices
        val t = Array(r) { IntArray(b.c) }
        for (i in 0..r - 1) {
            for (j in 0..b.c - 1) {
                for (k in 0 .. c - 1){
                    t[i][j] += m[i][k] * b.m[k][j]
                }
            }
        }
        return displayMat(t)
    }
}

fun displayarray(a: Array<IntArray>){
    for (row in a) {
        for (column in row) {
            print("$column     ")
        }
        println()
    }
    println()
}

fun main() {
    val firstMatrix = Matrix(arrayOf(intArrayOf(3, -2, 5), intArrayOf(3, 0, 4)), 2,
3)
    val secondMatrix = Matrix(arrayOf(intArrayOf(2, 3), intArrayOf(-9, 0),
intArrayOf(0, 4)), 3, 2)
    val secondMatrix1 = Matrix(arrayOf(intArrayOf(6, 3), intArrayOf(9, 0),
intArrayOf(5, 4)), 3, 2)

    println("************Addition************")
    println("Matrix:1 (3x2 Matrix)")
    displayarray(secondMatrix1.m)
    println("Matrix:2 (3x2 Matrix)")
    displayarray(secondMatrix.m)
    println("Addition: (3x2 Matrix)")
    val add = secondMatrix1 + secondMatrix
```

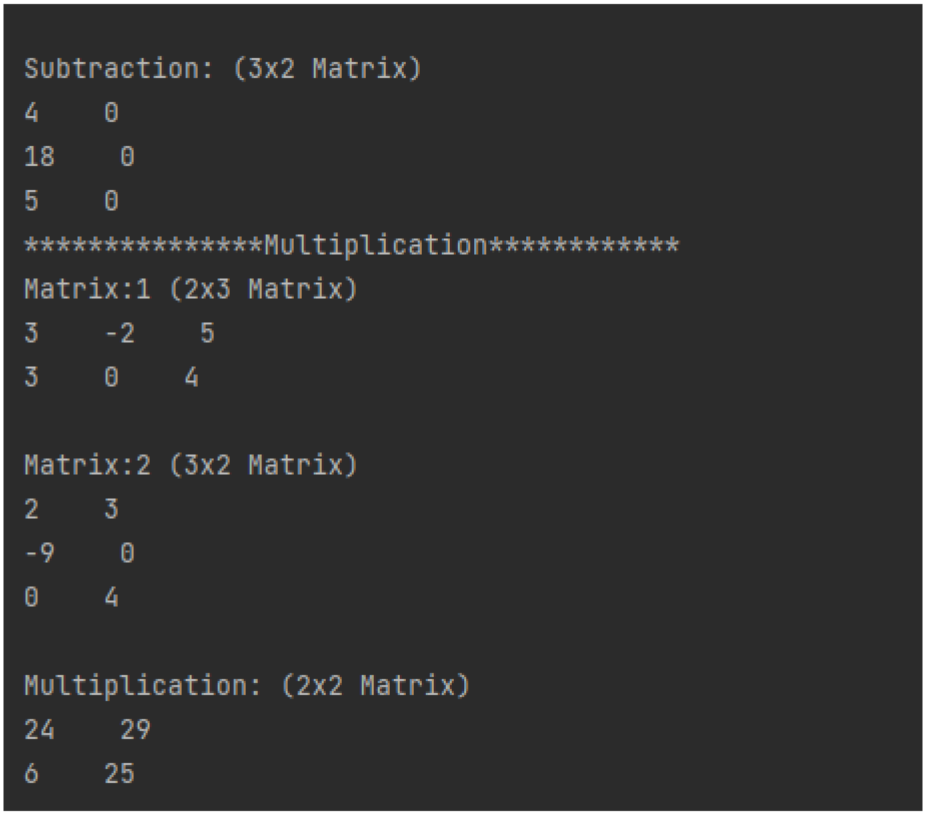


```
    println("**************Subtraction************")
    println("Matrix:1 (3x2 Matrix)")
    displayarray(secondMatrix1.m)
    println("Matrix:2 (3x2 Matrix)")
    displayarray(secondMatrix.m)
    println("Subtraction: (3x2 Matrix)")
    val sub = secondMatrix1 - secondMatrix

    println("**************Multiplication***********")
    println("Matrix:1 (2x3 Matrix)")
    displayarray(firstMatrix.m)
    println("Matrix:2 (3x2 Matrix)")
    displayarray(secondMatrix.m)
    println("Multiplication: (2x2 Matrix) ")
    val multiplication = firstMatrix * secondMatrix
}
```

Output:



```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe "-j
*************Addition*************
Matrix:1 (3x2 Matrix)
6    3
9    0
5    4

Matrix:2 (3x2 Matrix)
2    3
-9    0
0    4

Addition: (3x2 Matrix)
8    6
0    0
5    8
***************Subtraction*************
Matrix:1 (3x2 Matrix)
6    3
9    0
5    4

Matrix:2 (3x2 Matrix)
2    3
-9    0
0    4

Subtraction: (3x2 Matrix)
```



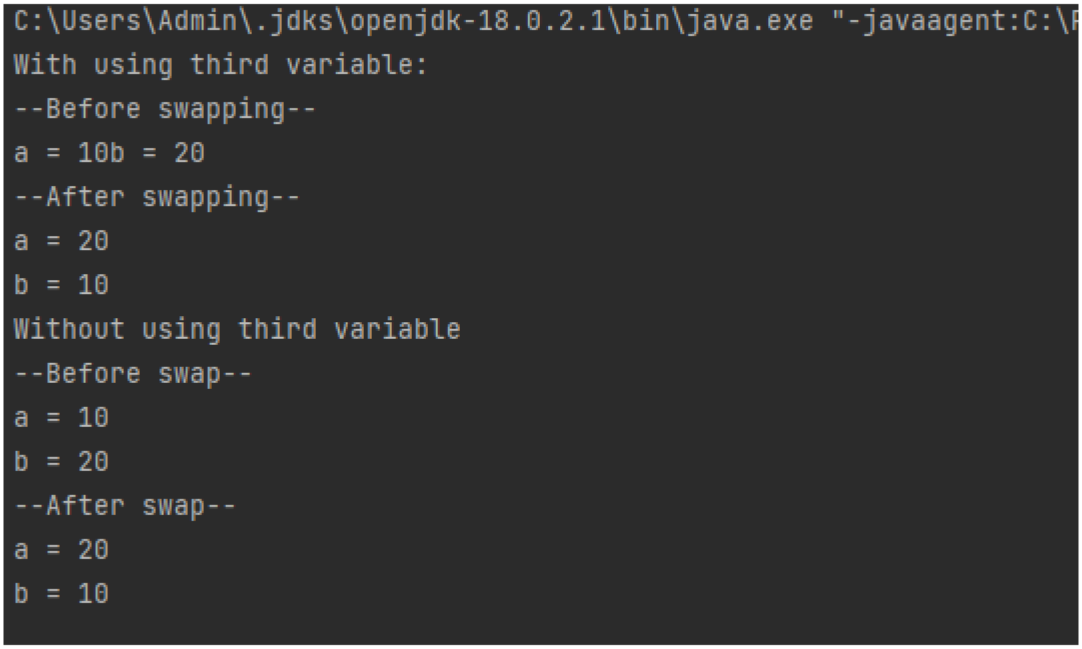
```
Subtraction: (3x2 Matrix)
4    0
18    0
5    0
***************Multiplication************
Matrix:1 (2x3 Matrix)
3    -2    5
3    0    4

Matrix:2 (3x2 Matrix)
2    3
-9    0
0    4

Multiplication: (2x2 Matrix)
24    29
6    25
```

E.1 Swap Value of two variables without using third variable and with using third variable.

Answer:

```
fun main() {

    println("With using third variable:")
    var a = 10
    var b = 20
    println("--Before swapping--")
    print("a = $a")
    println("b = $b")
    val temporary = a
    a = b
    b = temporary
    println("--After swapping--")
    println("a = $a")
    println("b = $b")

    println("Without using third variable")
    var a1 = 10
    var a2 = 20

    println("--Before swap--")
    println("a = $a1")
    println("b = $a2")

    a1 = a1 - a2
    a2 = a1 + a2
    a1 = a2 - a1

    println("--After swap--")
    println("a = $a1")
    println("b = $a2")
}
```

Output:



```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe "-javaagent:C:\
With using third variable:
--Before swapping--
a = 10b = 20
--After swapping--
a = 20
b = 10
Without using third variable
--Before swap--
a = 10
b = 20
--After swap--
a = 20
b = 10
```

E.2 Create two class named as Product and Laptop. Inherit with this information: Product class should be parent and child class should be Laptop class.

Add Product Name, Quantity, Amount per Quantity in Product class. In Laptop class add CPU name, RAM size, HDD Size, etc. of Laptop configuration.

Create primary and secondary Constructor of both class.

If Primary constructor is there then can we create secondary constructor in inheritance?

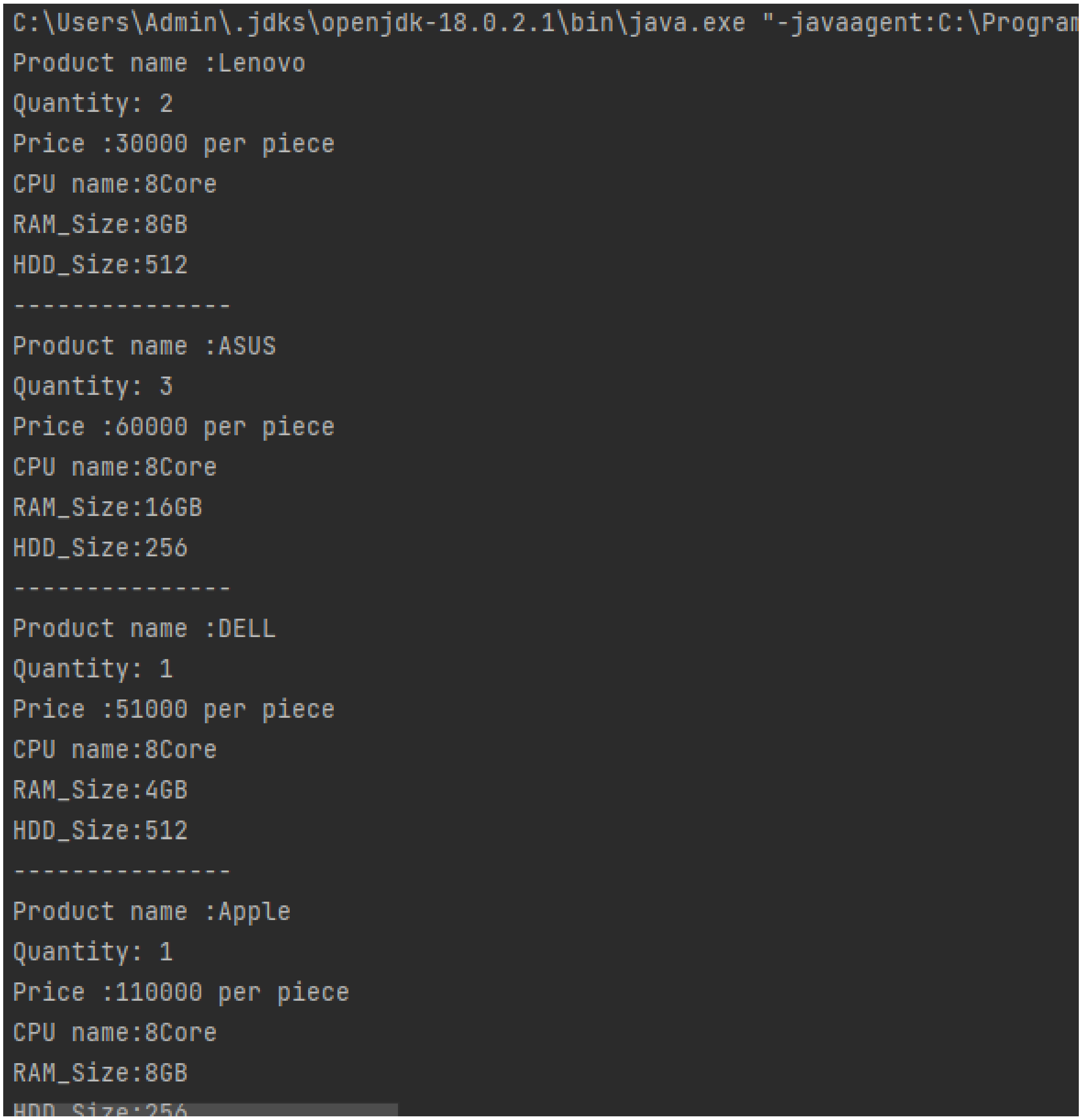
If we can create secondary and primary constructor both in child class then what is restriction if parent have more than two different secondary constructor?

Create List of 5 laptops in ArrayList and display all objects information.

Answer:

```
open class Product(name: String,quantity: Int){
    var p:Int=-1
    init {
        println("Product name :$name")
        println("Quantity: $quantity")

    }
    constructor(name: String,quantity: Int,p: Int) : this(name,quantity){
        this.p=p
        println("Price :$p per piece")
    }
}
class Laptop(name: String,quantity: Int,price :
Int,cpu_n:String,RAM_s:String):Product(name,quantity,price){
    var hdd:String=""
    init{
        println("CPU name:$cpu_n")
        println("RAM_Size:$RAM_s")

    }
    constructor(name: String,quantity:Int,price: Int,cpu_n: String,RAM_s:
String,hdd:String):this(name,quantity,price,cpu_n,RAM_s){
        this.hdd=hdd
        println("HDD_Size:$hdd")
        println("---------------")
    }

}

fun main(){
    var l1=Laptop("Lenovo",2,30000,"8Core","8GB","512")
    var l2=Laptop("ASUS",3,60000,"8Core","16GB","256")
    var l3=Laptop("DELL",1,51000,"8Core","4GB","512")
    var l4=Laptop("Apple",1,110000,"8Core","8GB","256")
    var l5=Laptop("HP",2,4500,"8Core","16GB","512")
}
```

Output:



```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe "-javaagent:C:\Progran
Product name :Lenovo
Quantity: 2
Price :30000 per piece
CPU name:8Core
RAM_Size:8GB
HDD_Size:512
---------------
Product name :ASUS
Quantity: 3
Price :60000 per piece
CPU name:8Core
RAM_Size:16GB
HDD_Size:256
---------------
Product name :DELL
Quantity: 1
Price :51000 per piece
CPU name:8Core
RAM_Size:4GB
HDD_Size:512
---------------
Product name :Apple
Quantity: 1
Price :110000 per piece
CPU name:8Core
RAM_Size:8GB
HDD_Size:256
```

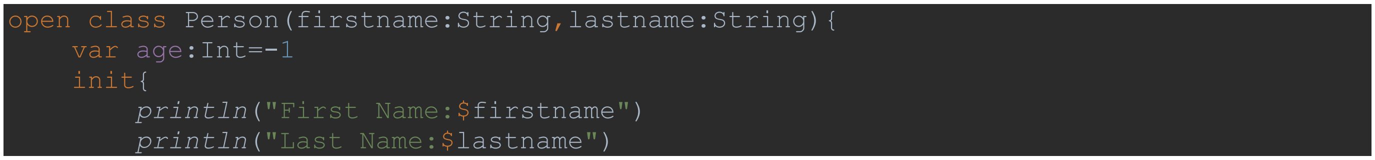
E.3 Create two class named as Person and Student. Inherit with this information: Person class should be parent and child class should be Student class.

Add first name, last name, age in Person class. In Laptop class add enrollment no, branch, class, lab batch, etc.

Create primary and secondary Constructor of both class.

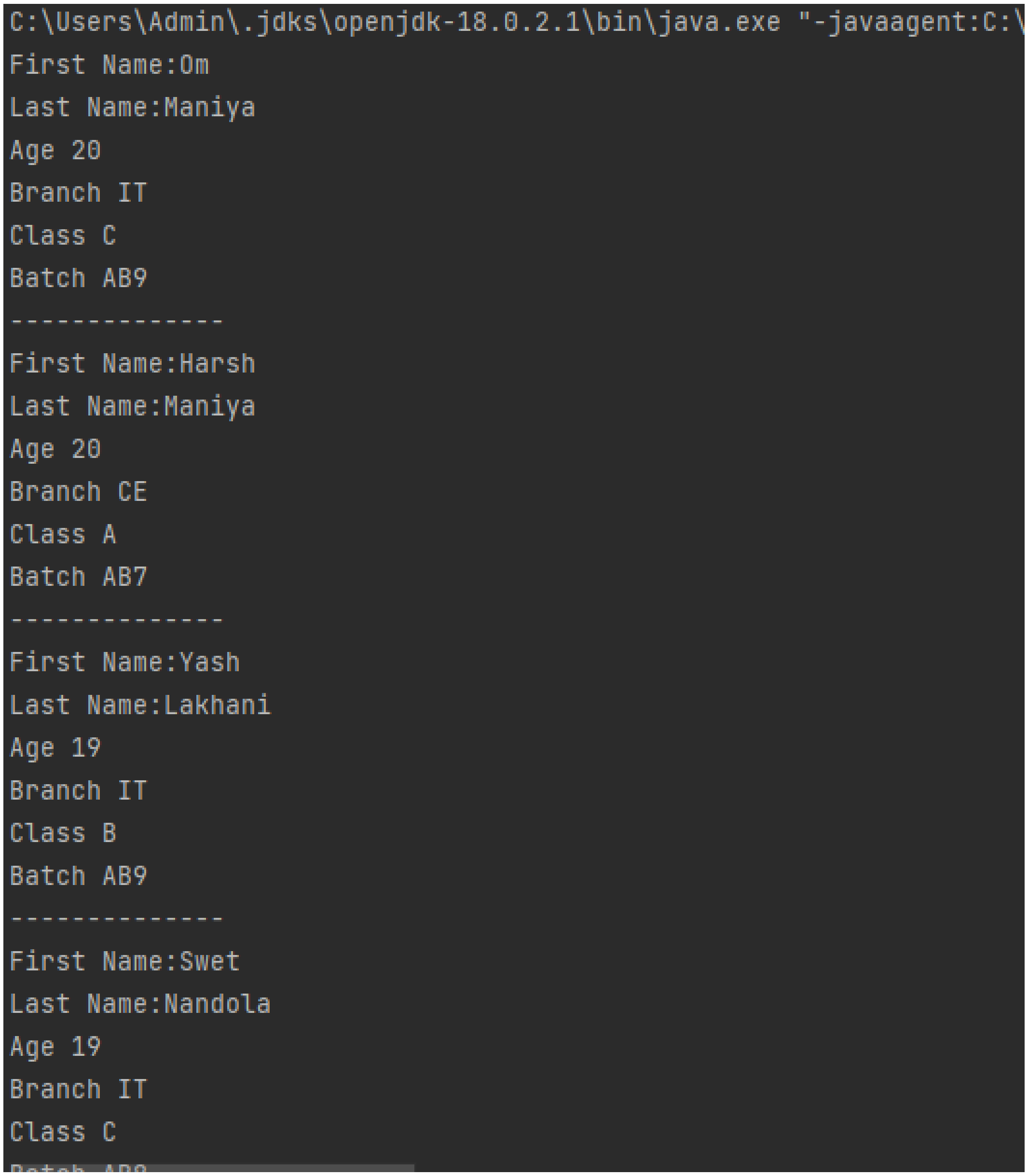
Create List of 5 students in ArrayList and display all objects information.

Answer:



```
open class Person(firstname:String,lastname:String){
    var age:Int=-1
    init{
        println("First Name:$firstname")
        println("Last Name:$lastname")
    }
    constructor(firstname: String,lastname:
String,age:Int):this(firstname,lastname){
        this.age=age
        println("Age $age")
    }
}
class Student(firstname:String,lastname:String,age:
Int,eno:Long,branch:String,Class:String):Person(firstname,lastname,age){
    var batch:String=""
    init{
        println("Branch $branch")
        println("Class $Class")
    }
    constructor(firstname:String,lastname:String,age:
Int,eno:Long,branch:String,Class:String,batch:String):this(firstname,lastname,age,en
o,branch,Class){
        this.batch=batch
        println("Batch $batch")
        println("--------------")
    }

}
fun main(){
    var s1=Student("Om","Maniya",20,20012021012,"IT","C","AB9")
    var s2=Student("Harsh","Maniya",20,20012011059,"CE","A","AB7")
    var s3=Student("Yash","Lakhani",19,20012021042,"IT","B","AB9")
    var s4=Student("Swet","Nandola",19,20012021015,"IT","C","AB8")
    var s5=Student("Hari","Talaviya",20,20012021063,"IT","A","AB2")

}
```

Output:



```
C:\Users\Admin\.jdks\openjdk-18.0.2.1\bin\java.exe "-javaagent:C:\
First Name:Om
Last Name:Maniya
Age 20
Branch IT
Class C
Batch AB9
--------------
First Name:Harsh
Last Name:Maniya
Age 20
Branch CE
Class A
Batch AB7
--------------
First Name:Yash
Last Name:Lakhani
Age 19
Branch IT
Class B
Batch AB9
--------------
First Name:Swet
Last Name:Nandola
Age 19
Branch IT
Class C
Batch AB8
```