Assignment – 44.1

Problem Statement

Task 1

A Fibonacci series (starting from 1) written in order without any spaces in between, thus producing a sequence of digits.

Write a Scala application to find the Nth digit in the sequence.

- Write the function using standard for loop
- Write the function using recursion

Task 2

Create a calculator to work with rational numbers.

Requirements:

- It should provide capability to add, subtract, divide and multiply rational

numbers

- Create a method to compute GCD (this will come in handy during operations on rational)

Add option to work with whole numbers which are also rational numbers i.e. (n/1)

- achieve the above using auxiliary constructors

- enable method overloading to enable each function to work with numbers and rational.

Task 3

1.Write a simple program to show inheritance in scala.

2.Write a simple program to show multiple inheritance in scala.

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3.Write a partial function to add three numbers in which one number is constant and two numbers can be passed as inputs and define another method which can take the partial function as input and squares the result.

4.Write a program to print the prices of 4 courses of Acadgild: Android-12999,Big Data Development-17999,Big Data Development-17999,Spark-19999 using match and add a default condition if the user enters any other course.

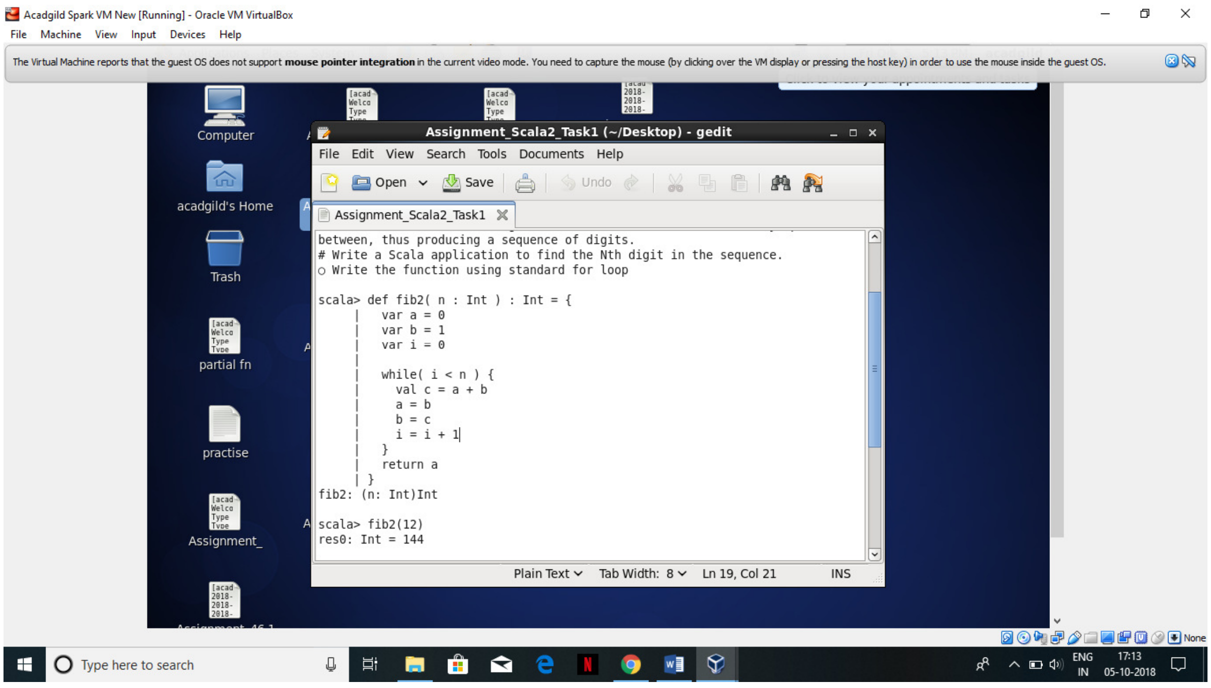
Task 1

A Fibonacci series (starting from 1) written in order without any spaces in between, thus producing a sequence of digits.

Write a Scala application to find the Nth digit in the sequence.

o Write the function using standard for loop

```
def fib2( n : Int ) : Int = {
    |  var a = 0
    |  var b = 1
    |  var i = 0
    |
    |  while( i < n ) {
    |    val c = a + b
    |    a = b
    |    b = c
    |    i = i + 1
    |  }
    |  return a
    | }
```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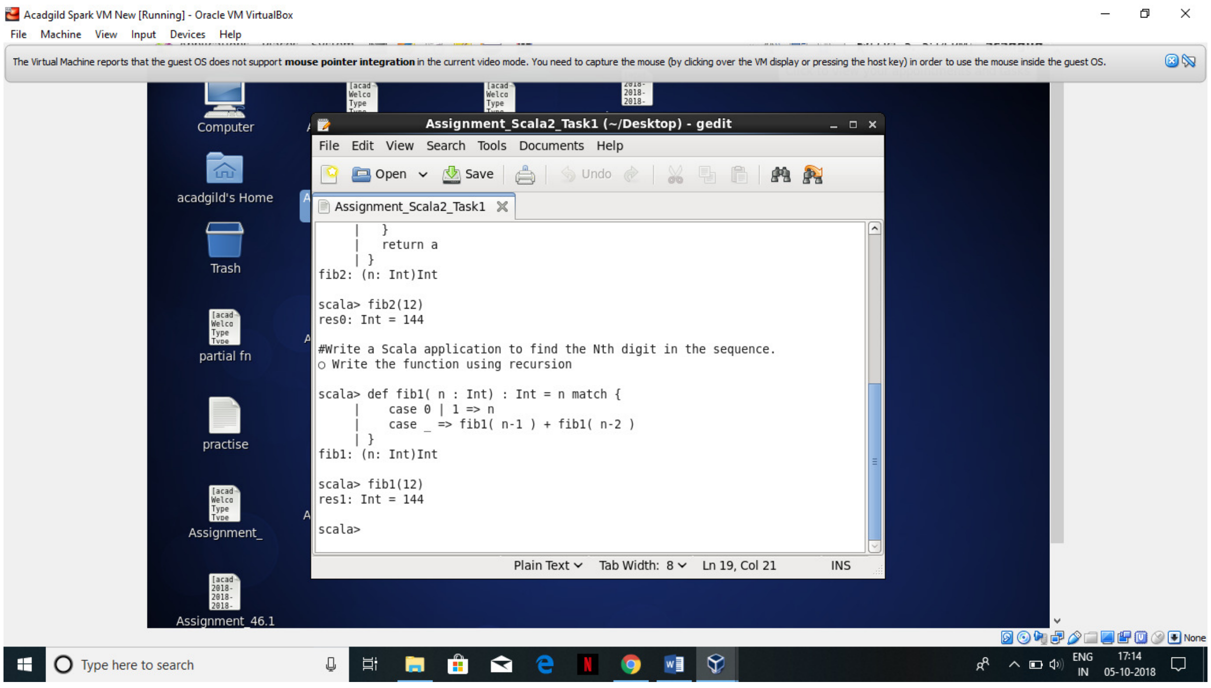
```
between, thus producing a sequence of digits.
# Write a Scala application to find the Nth digit in the sequence.
○ Write the function using standard for loop

scala> def fib2( n : Int ) : Int = {
     |   var a = 0
     |   var b = 1
     |   var i = 0
     |
     |   while( i < n ) {
     |     val c = a + b
     |     a = b
     |     b = c
     |     i = i + 1
     |   }
     |   return a
     | }
fib2: (n: Int)Int

scala> fib2(12)
res0: Int = 144
```

○ Write the function using recursion

```
def fib1( n : Int) : Int = n match {
    |    case 0 | 1 => n
    |    case _ => fib1( n-1 ) + fib1( n-2 )
    | }
```


Assignment_Scala2_Task1 (~/Desktop) - gedit

```
     |    }
     |    return a
     | }
fib2: (n: Int)Int

scala> fib2(12)
res0: Int = 144

#Write a Scala application to find the Nth digit in the sequence.
○ Write the function using recursion

scala> def fib1( n : Int) : Int = n match {
     |     case 0 | 1 => n
     |     case _  => fib1( n-1 ) + fib1( n-2 )
     | }
fib1: (n: Int)Int

scala> fib1(12)
res1: Int = 144

scala>
```

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Task 2

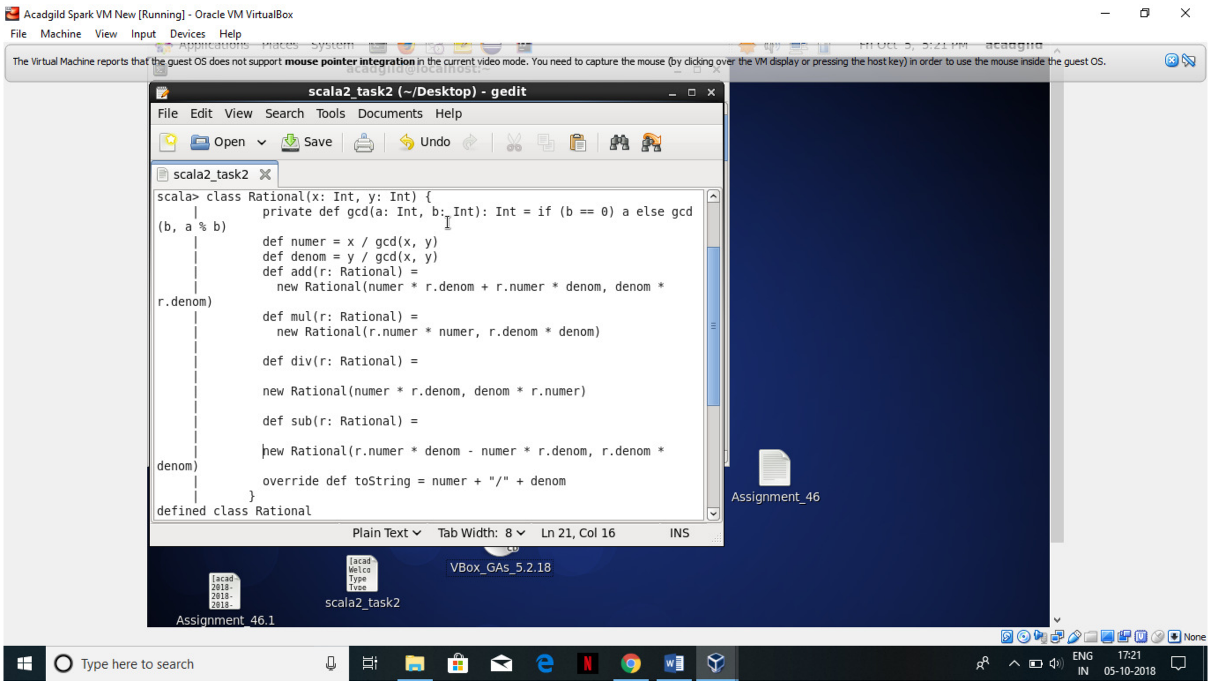
Create a calculator to work with rational numbers.

Requirements:

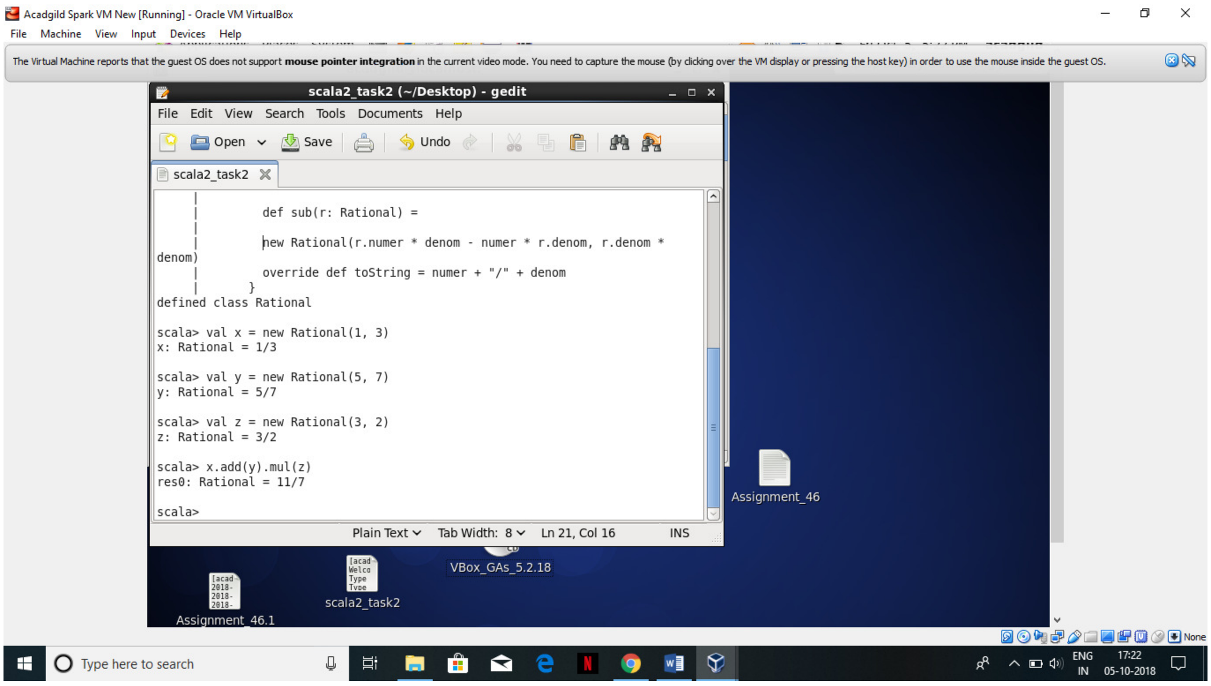
○ It should provide capability to add, subtract, divide and multiply rational numbers

○ Create a method to compute GCD (this will come in handy during operations on rational)

```
class Rational(x: Int, y: Int) {
      private def gcd(a: Int, b: Int): Int = if (b == 0) a else gcd(b, a % b)
      def numer = x / gcd(x, y)
      def denom = y / gcd(x, y)
      def add(r: Rational) =
        new Rational(numer * r.denom + r.numer * denom, denom * r.denom)
      def mul(r: Rational) =
        new Rational(r.numer * numer, r.denom * denom)
          def div(r: Rational) =
        new Rational(numer * r.denom, denom * r.numer)
      def sub(r: Rational) =
        new Rational(r.numer * denom - numer * r.denom, r.denom * denom)
  override def toString = numer + "/" + denom
}
```



```
scala> class Rational(x: Int, y: Int) {
     |         private def gcd(a: Int, b: Int): Int = if (b == 0) a else gcd
(b, a % b)
     |         def numer = x / gcd(x, y)
     |         def denom = y / gcd(x, y)
     |         def add(r: Rational) =
     |           new Rational(numer * r.denom + r.numer * denom, denom *
r.denom)
     |         def mul(r: Rational) =
     |           new Rational(r.numer * numer, r.denom * denom)
     |
     |         def div(r: Rational) =
     |
     |         new Rational(numer * r.denom, denom * r.numer)
     |
     |         def sub(r: Rational) =
     |
     |         new Rational(r.numer * denom - numer * r.denom, r.denom *
denom)
     |         override def toString = numer + "/" + denom
     |       }
defined class Rational
```



```
     |
     |         def sub(r: Rational) =
     |
     |         new Rational(r.numer * denom - numer * r.denom, r.denom *
denom)
     |         override def toString = numer + "/" + denom
     |       }
defined class Rational

scala> val x = new Rational(1, 3)
x: Rational = 1/3

scala> val y = new Rational(5, 7)
y: Rational = 5/7

scala> val z = new Rational(3, 2)
z: Rational = 3/2

scala> x.add(y).mul(z)
res0: Rational = 11/7

scala>
```

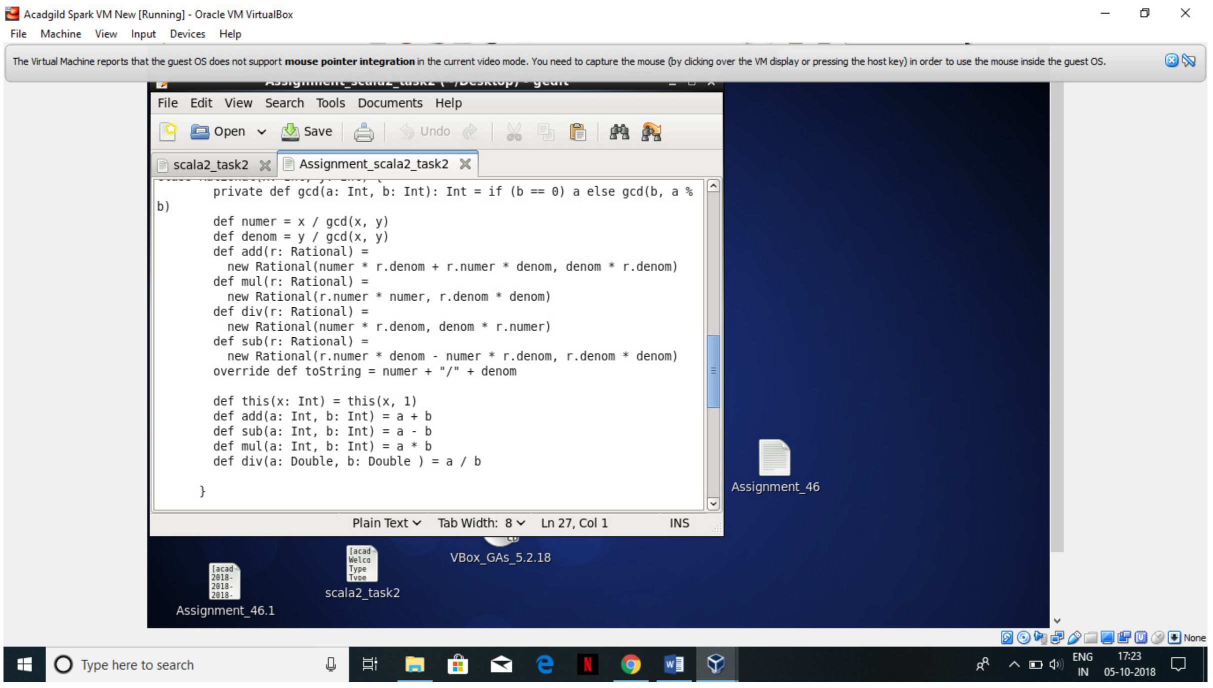
Add option to work with whole numbers which are also rational numbers i.e. (n/1)

- achieve the above using auxiliary constructors

- enable method overloading to enable each function to work with numbers and rational.

```
class Rational(x: Int, y: Int) {
    private def gcd(a: Int, b: Int): Int = if (b == 0) a else gcd(b, a % b)
    def numer = x / gcd(x, y)
    def denom = y / gcd(x, y)
    def add(r: Rational) =
      new Rational(numer * r.denom + r.numer * denom, denom * r.denom)
    def mul(r: Rational) =
      new Rational(r.numer * numer, r.denom * denom)
        def div(r: Rational) =
          new Rational(numer * r.denom, denom * r.numer)
        def sub(r: Rational) =
          new Rational(r.numer * denom - numer * r.denom, r.denom * denom)
    override def toString = numer + "/" + denom
        def this(x: Int) = this(x, 1)
        def add(a: Int, b: Int) = a + b
        def sub(a: Int, b: Int) = a - b
        def mul(a: Int, b: Int) = a * b
        def div(a: Double, b: Double ) = a / b

  }
```


Acadgild Spark VM New [Running] - Oracle VM VirtualBox
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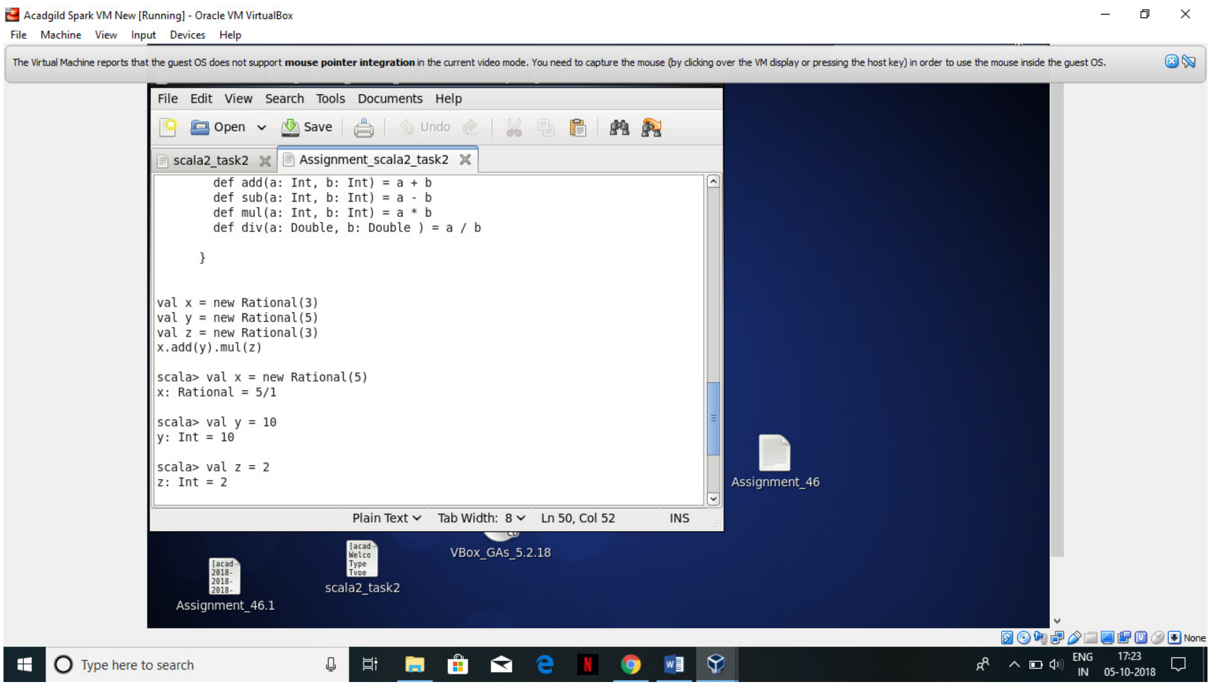
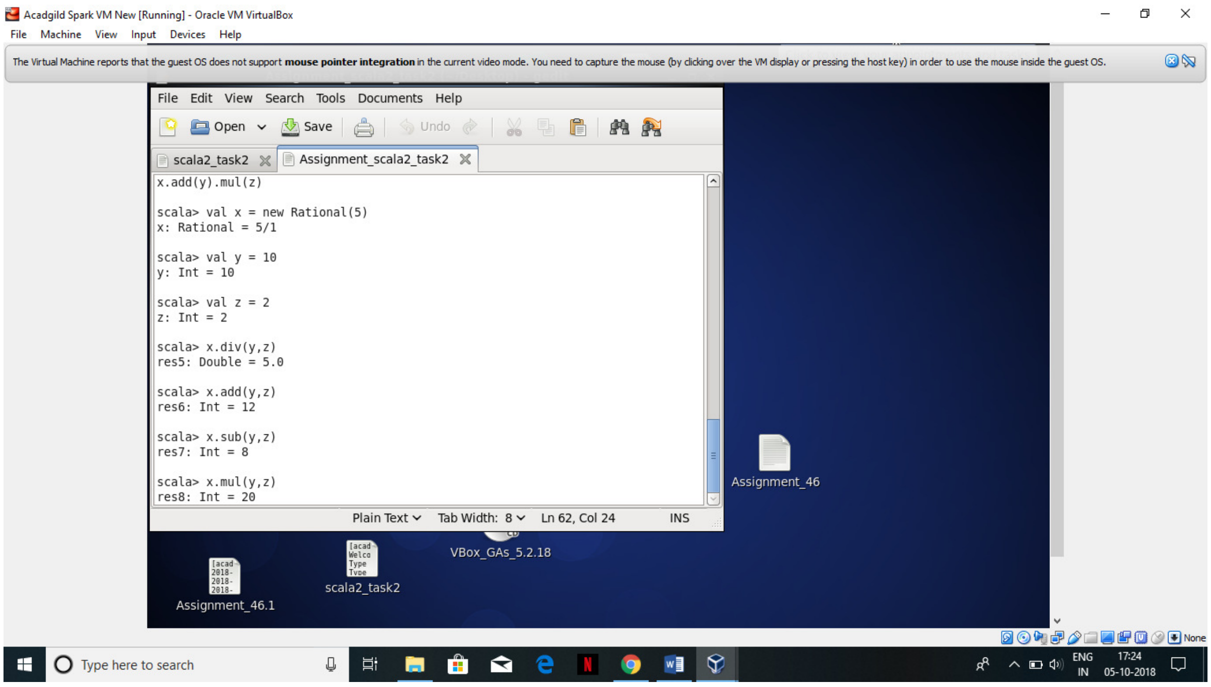
```
        private def gcd(a: Int, b: Int): Int = if (b == 0) a else gcd(b, a %
b)
        def numer = x / gcd(x, y)
        def denom = y / gcd(x, y)
        def add(r: Rational) =
          new Rational(numer * r.denom + r.numer * denom, denom * r.denom)
        def mul(r: Rational) =
          new Rational(r.numer * numer, r.denom * denom)
        def div(r: Rational) =
          new Rational(numer * r.denom, denom * r.numer)
        def sub(r: Rational) =
          new Rational(r.numer * denom - numer * r.denom, r.denom * denom)
        override def toString = numer + "/" + denom

        def this(x: Int) = this(x, 1)
        def add(a: Int, b: Int) = a + b
        def sub(a: Int, b: Int) = a - b
        def mul(a: Int, b: Int) = a * b
        def div(a: Double, b: Double ) = a / b

      }
```



```
      def add(a: Int, b: Int) = a + b
      def sub(a: Int, b: Int) = a - b
      def mul(a: Int, b: Int) = a * b
      def div(a: Double, b: Double ) = a / b

    }


val x = new Rational(3)
val y = new Rational(5)
val z = new Rational(3)
x.add(y).mul(z)

scala> val x = new Rational(5)
x: Rational = 5/1

scala> val y = 10
y: Int = 10

scala> val z = 2
z: Int = 2
```



```
x.add(y).mul(z)

scala> val x = new Rational(5)
x: Rational = 5/1

scala> val y = 10
y: Int = 10

scala> val z = 2
z: Int = 2

scala> x.div(y,z)
res5: Double = 5.0

scala> x.add(y,z)
res6: Int = 12

scala> x.sub(y,z)
res7: Int = 8

scala> x.mul(y,z)
res8: Int = 20
```

Task 3

1.Write a simple program to show inheritance in scala.

```
class Employee{
     |       var salary:Float = 10000
     |    }
defined class Employee
```

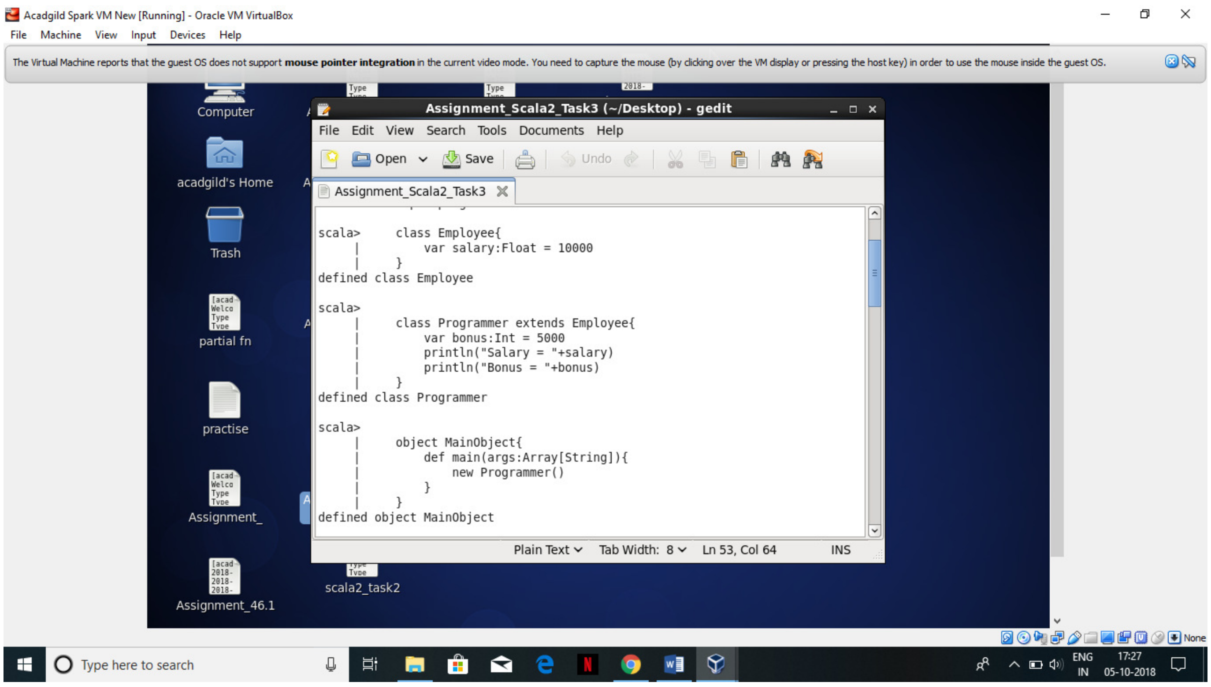
```
     |     class Programmer extends Employee{
     |         var bonus:Int = 5000
     |         println("Salary = "+salary)
     |         println("Bonus = "+bonus)
     |     }
defined class Programmer
```

Extend used to inherit the base class

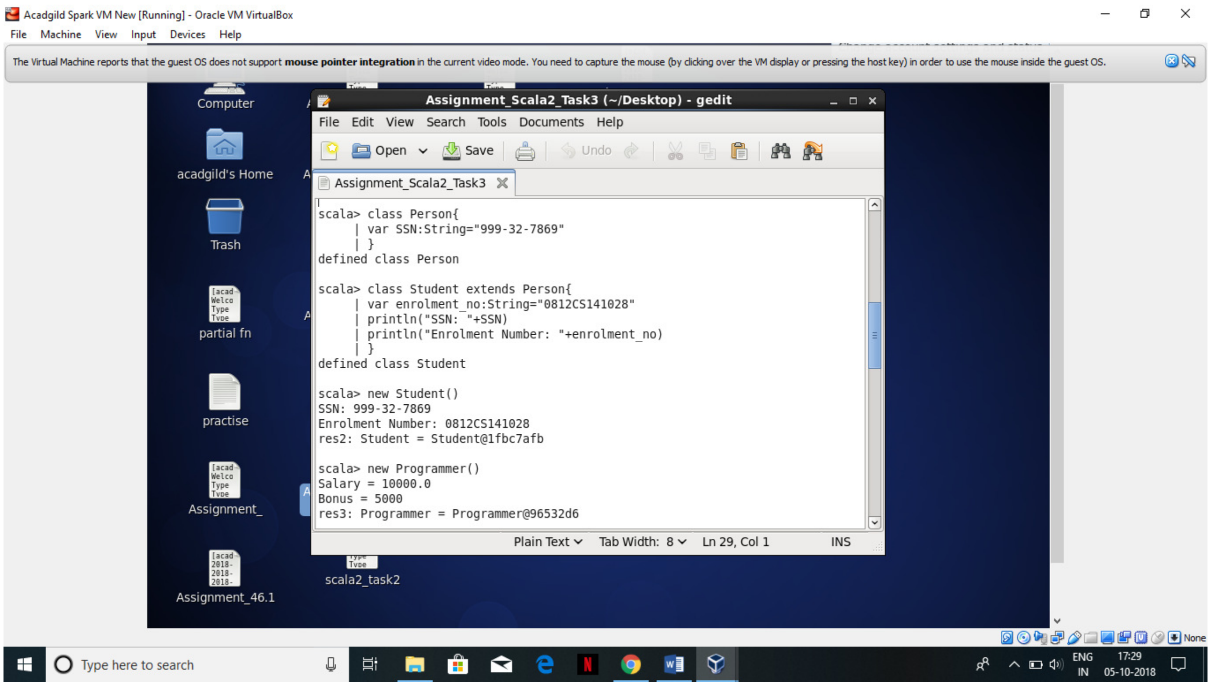
```
     |     object MainObject{
     |         def main(args:Array[String]){
     |             new Programmer()
     |         }
     |     }
defined object MainObject


 class Person{
     | var SSN:String="999-32-7869"
     | }
defined class Person

 class Student extends Person{
     | var enrolment_no:String="0812CS141028"
     | println("SSN: "+SSN)
     | println("Enrolment Number: "+enrolment_no)
     | }
defined class Student
```

Extend used to inherit the base class

```
 new Student()
SSN: 999-32-7869
Enrolment Number: 0812CS141028
res2: Student = Student@1fbc7afb

 new Programmer()
Salary = 10000.0
Bonus = 5000
res3: Programmer = Programmer@96532d6
```



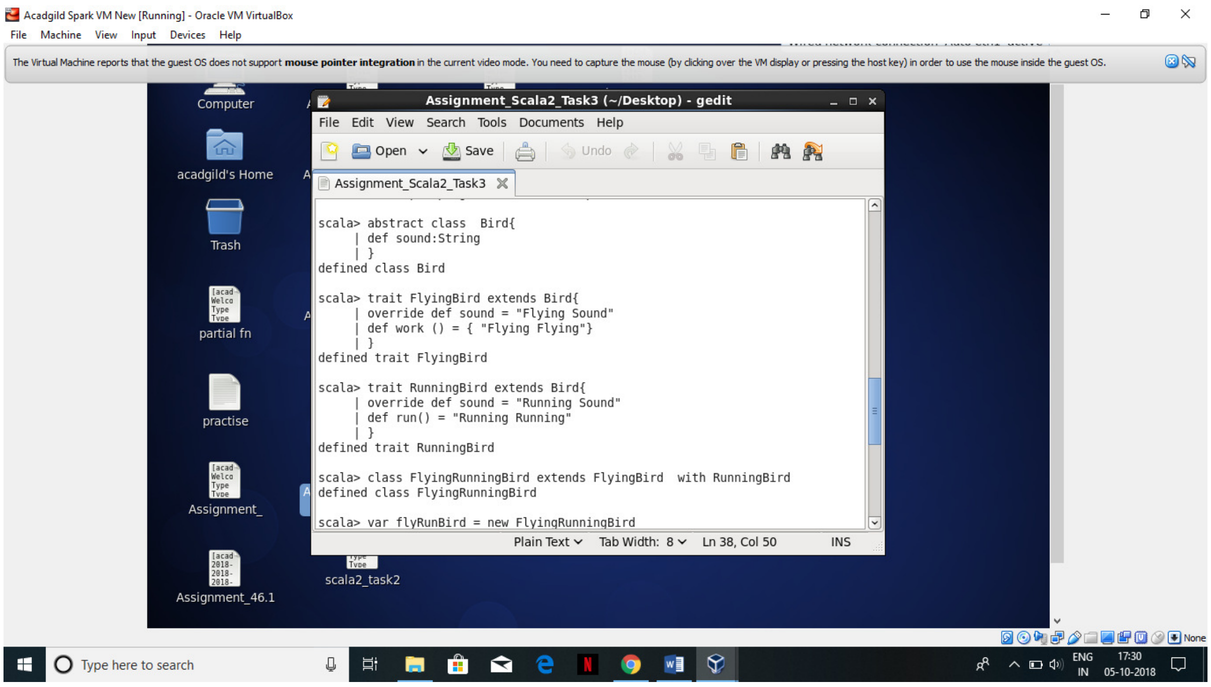
```
scala>     class Employee{
     |         var salary:Float = 10000
     |     }
defined class Employee

scala>
     |     class Programmer extends Employee{
     |         var bonus:Int = 5000
     |         println("Salary = "+salary)
     |         println("Bonus = "+bonus)
     |     }
defined class Programmer

scala>
     |     object MainObject{
     |         def main(args:Array[String]){
     |             new Programmer()
     |         }
     |     }
defined object MainObject
```



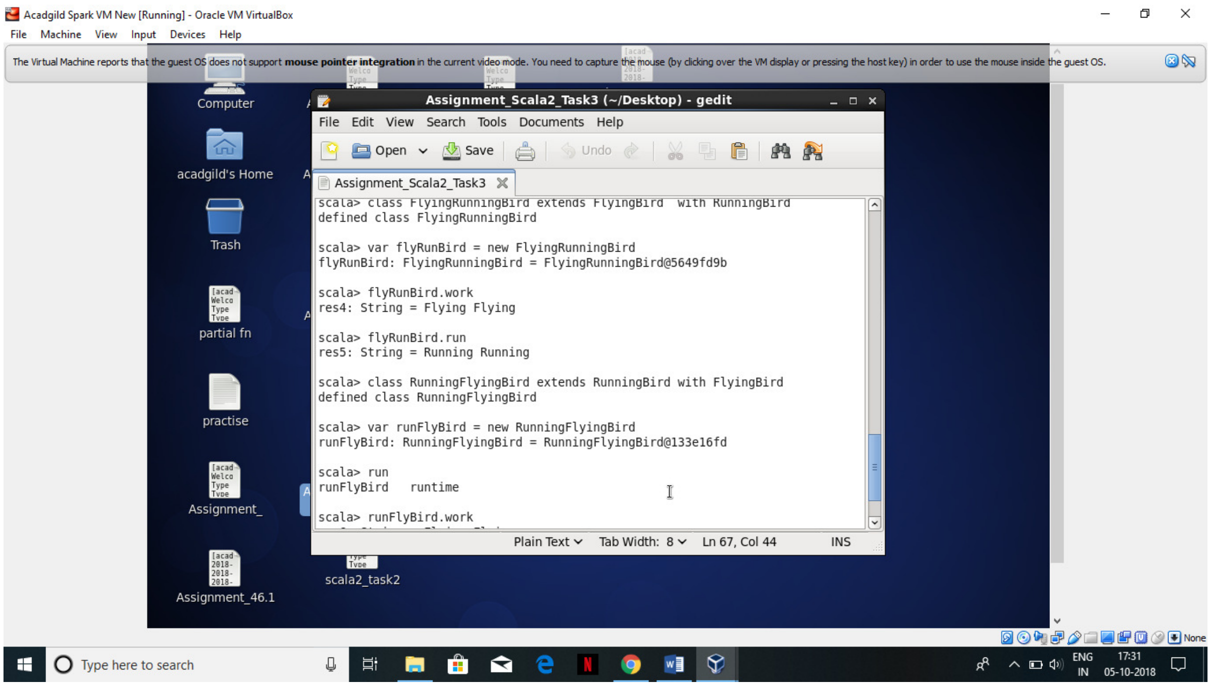
```
scala> class Person{
     | var SSN:String="999-32-7869"
     | }
defined class Person

scala> class Student extends Person{
     | var enrolment_no:String="0812CS141028"
     | println("SSN: "+SSN)
     | println("Enrolment Number: "+enrolment_no)
     | }
defined class Student

scala> new Student()
SSN: 999-32-7869
Enrolment Number: 0812CS141028
res2: Student = Student@1fbc7afb

scala> new Programmer()
Salary = 10000.0
Bonus = 5000
res3: Programmer = Programmer@96532d6
```

2.Write a simple program to show multiple inheritance in scala.

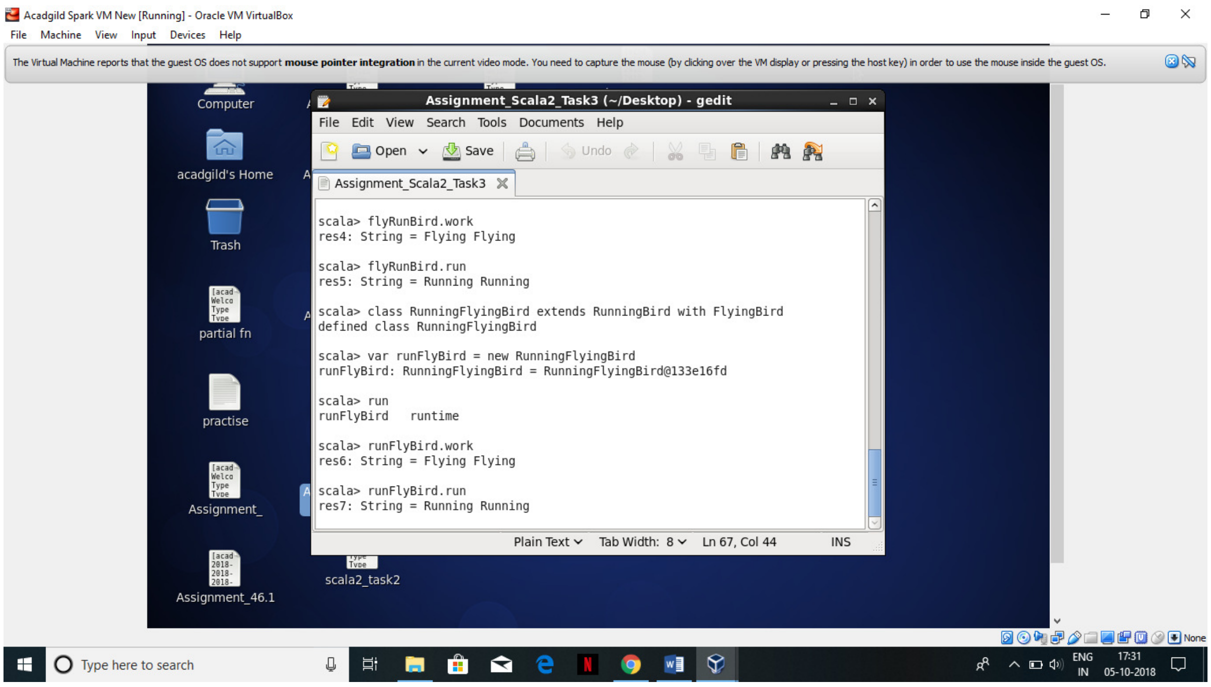
```
abstract class  Bird{
     | def sound:String
     | }
defined class Bird

 trait FlyingBird extends Bird{
     | override def sound = "Flying Sound"
     | def work () = { "Flying Flying"}
     | }
defined trait FlyingBird

 trait RunningBird extends Bird{
     | override def sound = "Running Sound"
     | def run() = "Running Running"
     | }
defined trait RunningBird

 class FlyingRunningBird extends FlyingBird  with RunningBird
defined class FlyingRunningBird

 var flyRunBird = new FlyingRunningBird
flyRunBird: FlyingRunningBird = FlyingRunningBird@5649fd9b

 flyRunBird.work
res4: String = Flying Flying

 flyRunBird.run
res5: String = Running Running

 class RunningFlyingBird extends RunningBird with FlyingBird
defined class RunningFlyingBird

var runFlyBird = new RunningFlyingBird
runFlyBird: RunningFlyingBird = RunningFlyingBird@133e16fd

 run
runFlyBird   runtime

 runFlyBird.work
res6: String = Flying Flying

 runFlyBird.run
res7: String = Running Running
```



```
scala> abstract class  Bird{
     | def sound:String
     | }
defined class Bird

scala> trait FlyingBird extends Bird{
     | override def sound = "Flying Sound"
     | def work () = { "Flying Flying"}
     | }
defined trait FlyingBird

scala> trait RunningBird extends Bird{
     | override def sound = "Running Sound"
     | def run() = "Running Running"
     | }
defined trait RunningBird

scala> class FlyingRunningBird extends FlyingBird  with RunningBird
defined class FlyingRunningBird

scala> var flyRunBird = new FlyingRunningBird
```



```
scala> class FlyingRunningBird extends FlyingBird  with RunningBird
defined class FlyingRunningBird

scala> var flyRunBird = new FlyingRunningBird
flyRunBird: FlyingRunningBird = FlyingRunningBird@5649fd9b

scala> flyRunBird.work
res4: String = Flying Flying

scala> flyRunBird.run
res5: String = Running Running

scala> class RunningFlyingBird extends RunningBird with FlyingBird
defined class RunningFlyingBird

scala> var runFlyBird = new RunningFlyingBird
runFlyBird: RunningFlyingBird = RunningFlyingBird@133e16fd

scala> run
runFlyBird   runtime

scala> runFlyBird.work
```


Acadgild Spark VM New [Running] - Oracle VM VirtualBox
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```
scala> flyRunBird.work
res4: String = Flying Flying

scala> flyRunBird.run
res5: String = Running Running

scala> class RunningFlyingBird extends RunningBird with FlyingBird
defined class RunningFlyingBird

scala> var runFlyBird = new RunningFlyingBird
runFlyBird: RunningFlyingBird = RunningFlyingBird@133e16fd

scala> run
runFlyBird   runtime

scala> runFlyBird.work
res6: String = Flying Flying

scala> runFlyBird.run
res7: String = Running Running
```

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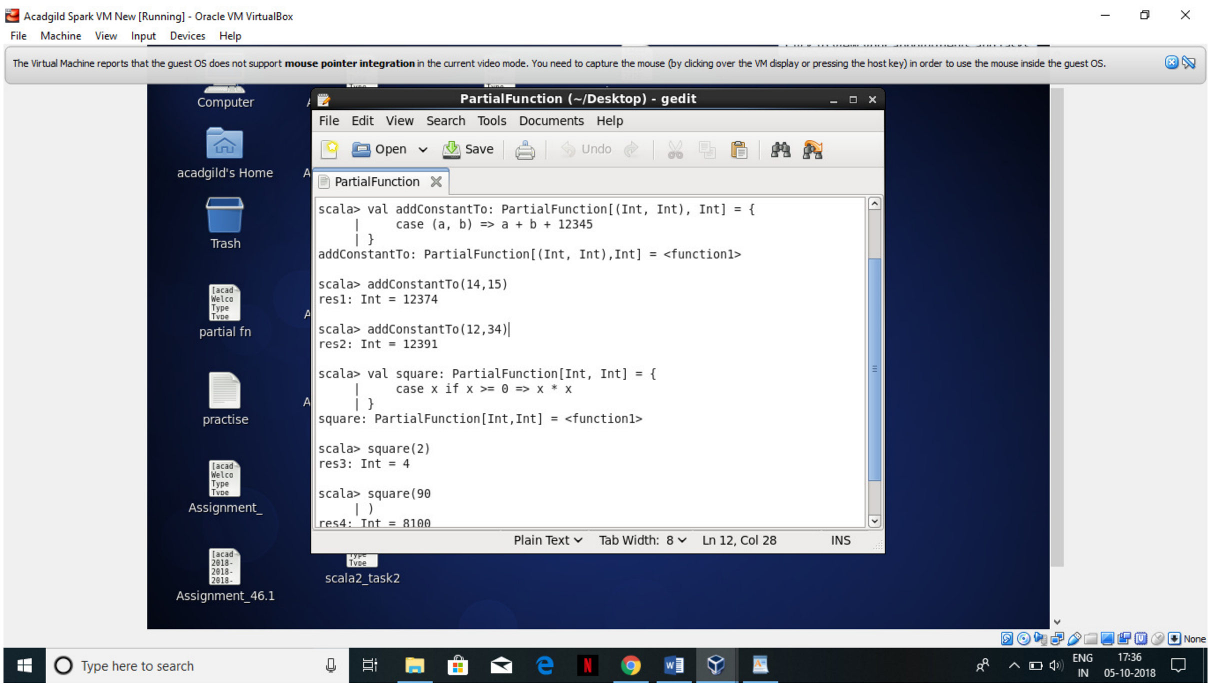
3.Write a partial function to add three numbers in which one number is constant and two numbers can be passed as inputs and define another method which can take the partial function as input and squares the result.

```
val addConstantTo: PartialFunction[(Int, Int), Int] = {
     |     case (a, b) => a + b + 12345
     | }
addConstantTo: PartialFunction[(Int, Int),Int] = <function1>

 addConstantTo(14,15)
res1: Int = 12374

 addConstantTo(12,34)
res2: Int = 12391

 val square: PartialFunction[Int, Int] = {
     |     case x if x >= 0 => x * x
     | }
square: PartialFunction[Int,Int] = <function1>

 square(2)
res3: Int = 4

 square(90
     | )
res4: Int = 8100
```

square(addConstantTo(12,34))
res5: Int = 153536881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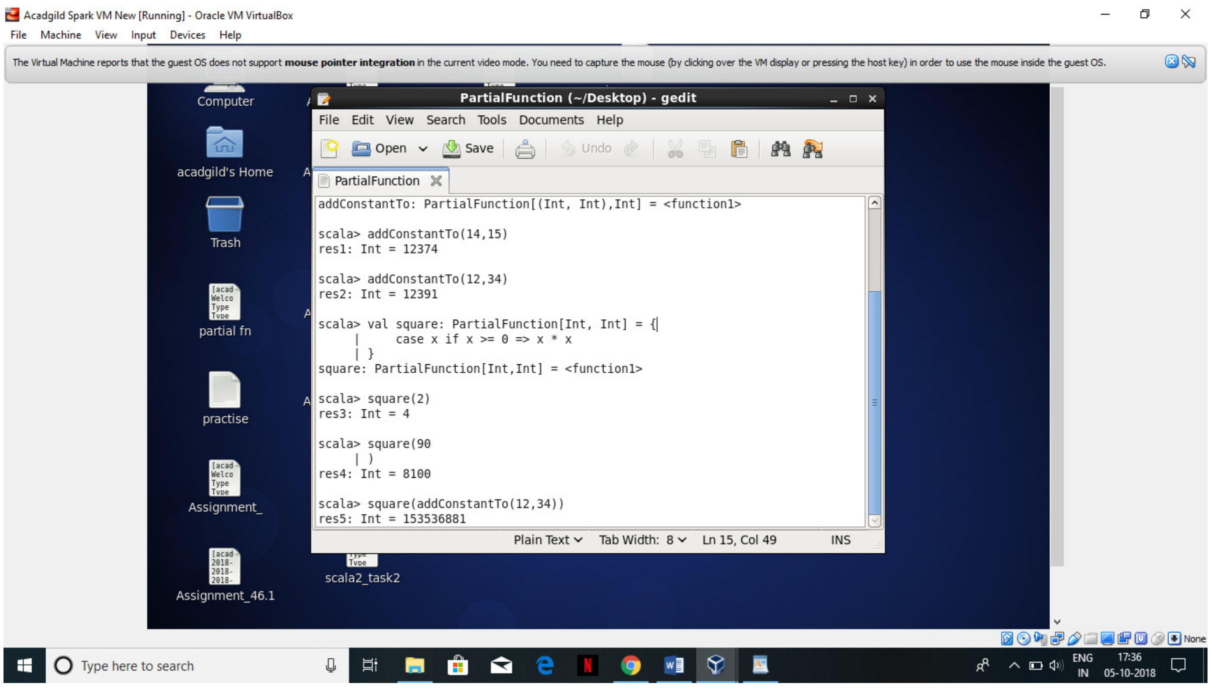
The Virtual Machine reports that the guest OS does not support **mouse pointer integration** in the current video mode. You need to capture the mouse (by clicking over the VM display or pressing the host key) in order to use the mouse inside the guest OS.

```
scala> val addConstantTo: PartialFunction[(Int, Int), Int] = {
     |     case (a, b) => a + b + 12345
     | }
addConstantTo: PartialFunction[(Int, Int),Int] = <function1>

scala> addConstantTo(14,15)
res1: Int = 12374

scala> addConstantTo(12,34)
res2: Int = 12391

scala> val square: PartialFunction[Int, Int] = {
     |     case x if x >= 0 => x * x
     | }
square: PartialFunction[Int,Int] = <function1>

scala> square(2)
res3: Int = 4

scala> square(90
     | )
res4: Int = 8100
```


Acadgild Spark VM New [Running] - Oracle VM VirtualBox
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PartialFunction (~/Desktop) - gedit
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ENG IN 17:36 05-10-2018

The Virtual Machine reports that the guest OS does not support **mouse pointer integration** in the current video mode. You need to capture the mouse (by clicking over the VM display or pressing the host key) in order to use the mouse inside the guest OS.

```
addConstantTo: PartialFunction[(Int, Int),Int] = <function1>

scala> addConstantTo(14,15)
res1: Int = 12374

scala> addConstantTo(12,34)
res2: Int = 12391

scala> val square: PartialFunction[Int, Int] = {
     |     case x if x >= 0 => x * x
     | }
square: PartialFunction[Int,Int] = <function1>

scala> square(2)
res3: Int = 4

scala> square(90
     | )
res4: Int = 8100

scala> square(addConstantTo(12,34))
res5: Int = 153536881
```

4.Write a program to print the prices of 4 courses of Acadgild: Android-12999,Big Data Development-17999,Big Data Development-17999,Spark-

19999 using match and add a default condition if the user enters any other course.

```
val acadgildCourses: PartialFunction[String, Int] = {
     |     case course: String if course == "Android" => 12999
     |     case course: String if course == "Big Data" => 17999
     |     case course: String if course == "Big Data2" => 17999
     |     case course: String if course == "Spark" => 19999
     | }
acadgildCourses: PartialFunction[String,Int] = <function1>

val defaultCourse: PartialFunction[Any, Int] = {
     |     case _ => 10999
     | }
defaultCourse: PartialFunction[Any,Int] = <function1>
```

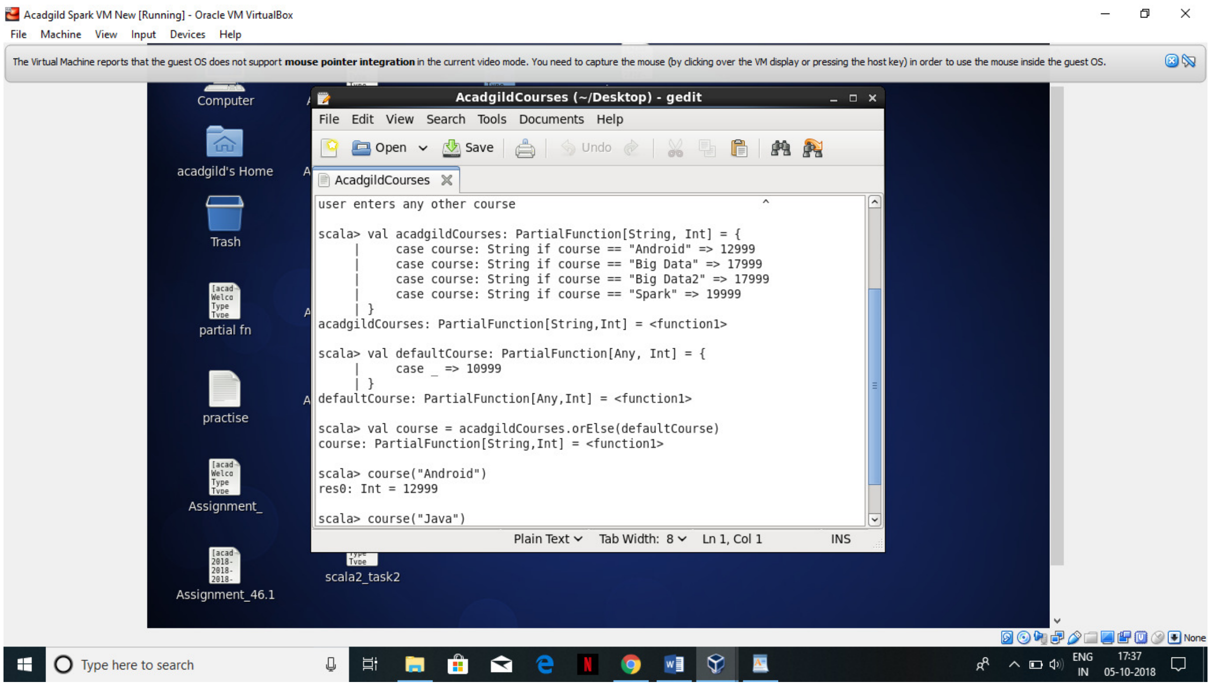
This is statement used for default condition

```
val course = acadgildCourses.orElse(defaultCourse)
course: PartialFunction[String,Int] = <function1>
```

Concatenate default condition with others

```
course("Android")
res0: Int = 12999

course("Java")
res1: Int = 10999
```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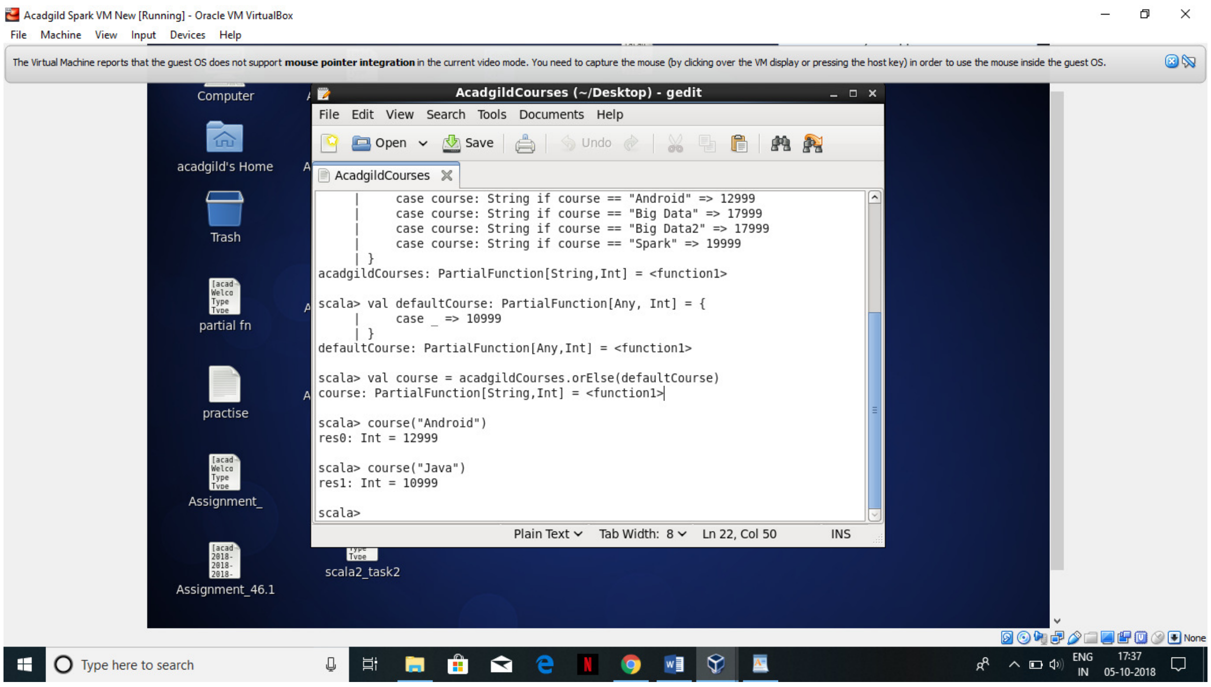
scala2_task2
AcadgildCourses (~/Desktop) - gedit
File Edit View Search Tools Documents Help
Open Save Undo
AcadgildCourses
Plain Text Tab Width: 8 Ln 1, Col 1 INS
Type here to search
ENG IN 17:37 05-10-2018

The Virtual Machine reports that the guest OS does not support **mouse pointer integration** in the current video mode. You need to capture the mouse (by clicking over the VM display or pressing the host key) in order to use the mouse inside the guest OS.

```
user enters any other course

scala> val acadgildCourses: PartialFunction[String, Int] = {
     |     case course: String if course == "Android" => 12999
     |     case course: String if course == "Big Data" => 17999
     |     case course: String if course == "Big Data2" => 17999
     |     case course: String if course == "Spark" => 19999
     | }
acadgildCourses: PartialFunction[String,Int] = <function1>

scala> val defaultCourse: PartialFunction[Any, Int] = {
     |     case _ => 10999
     | }
defaultCourse: PartialFunction[Any,Int] = <function1>

scala> val course = acadgildCourses.orElse(defaultCourse)
course: PartialFunction[String,Int] = <function1>

scala> course("Android")
res0: Int = 12999

scala> course("Java")
```



```
     |      case course: String if course == "Android" => 12999
     |      case course: String if course == "Big Data" => 17999
     |      case course: String if course == "Big Data2" => 17999
     |      case course: String if course == "Spark" => 19999
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scala> val defaultCourse: PartialFunction[Any, Int] = {
     |      case _ => 10999
     | }
defaultCourse: PartialFunction[Any,Int] = <function1>

scala> val course = acadgildCourses.orElse(defaultCourse)
course: PartialFunction[String,Int] = <function1>

scala> course("Android")
res0: Int = 12999

scala> course("Java")
res1: Int = 10999

scala>
```

Acadgild Spark VM New [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
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File Edit View Search Tools Documents Help
Open Save Undo
AcadgildCourses
Plain Text Tab Width: 8 Ln 22, Col 50 INS
Computer
acadgild's Home
Trash
partial fn
practise
Assignment_
Assignment_46.1
scala2_task2
Type here to search
ENG IN 17:37 05-10-2018