Session 15:

SCALA BASICS 2

Task 1

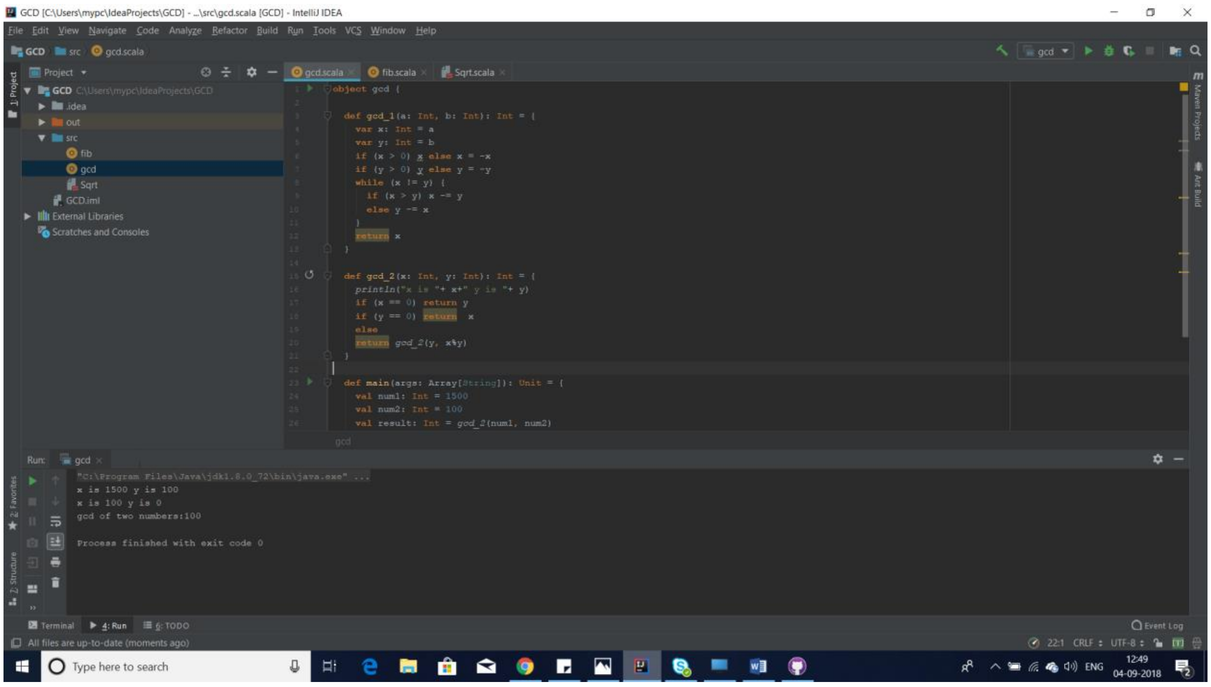
Create a Scala application to find the GCD of two numbers

Solution: We can compute the gcd in the following ways:

```
Object gcd {
def gcd_1(a: Int,    b:Int): Int ={
var x : Int =a
var y :Int =b
if(x>0) x else x=-x
if(y>0)y else y=-y
while(x!=y){
if(x>y) x=x-y
else y=y-x
}
Return x
}

//Another way is:
def gcd_2(x:Int, b:int){
if(x==0) return y
if(y==0) return x
else return gcd_2(y, x%y)
}
Def main(args:Array[String]):unit{
val num1 :Int =1500
val num2 :Int= 100
val result :Int =gcd_2(num1,num2)
println("GCD  of two numbers is :"+ result)
```

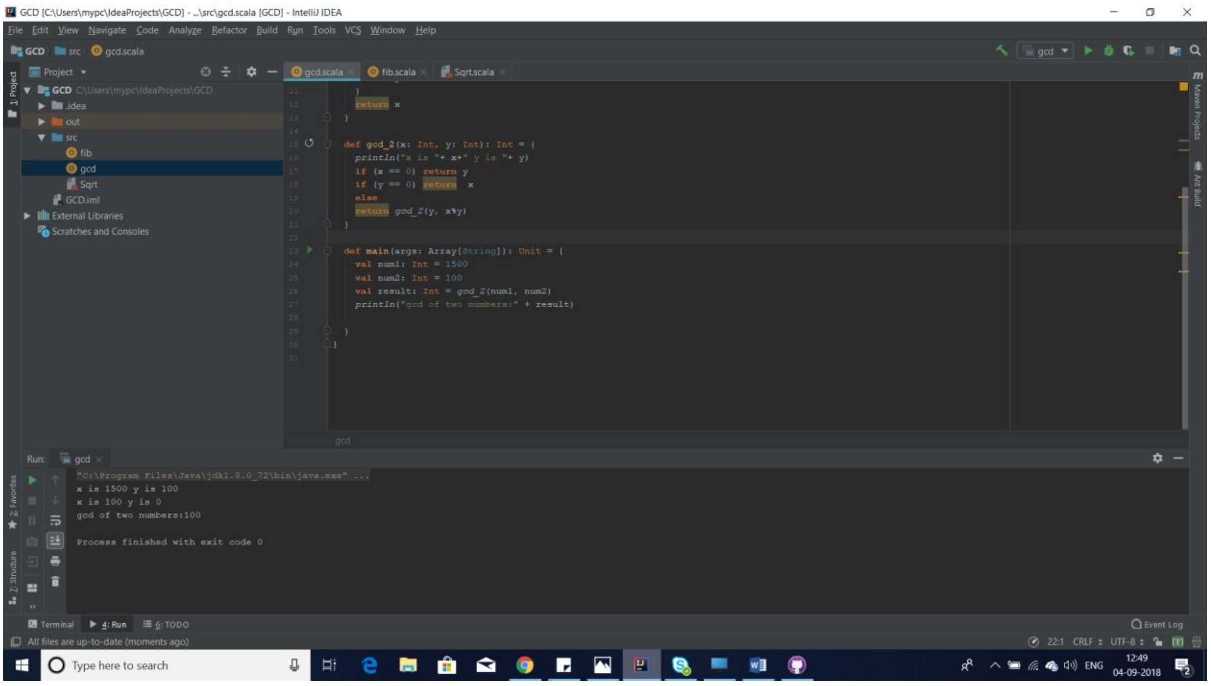
}

}



```
object gcd {

  def gcd_1(a: Int, b: Int): Int = {
    var x: Int = a
    var y: Int = b
    if (x > 0) x else x = -x
    if (y > 0) y else y = -y
    while (x != y) {
      if (x > y) x -= y
      else y -= x
    }
    return x
  }

  def gcd_2(x: Int, y: Int): Int = {
    println("x is "+ x+" y is "+ y)
    if (x == 0) return y
    if (y == 0) return  x
    else
    return gcd_2(y, x%y)
  }

  def main(args: Array[String]): Unit = {
    val num1: Int = 1500
    val num2: Int = 100
    val result: Int = gcd_2(num1, num2)
```

```
"C:\Program Files\Java\jdk1.8.0_72\bin\java.exe" ...
x is 1500 y is 100
x is 100 y is 0
gcd of two numbers:100

Process finished with exit code 0
```



```
    }
    return x
  }

  def gcd_2(x: Int, y: Int): Int = {
    println("x is "+ x+" y is "+ y)
    if (x == 0) return y
    if (y == 0) return  x
    else
    return gcd_2(y, x%y)
  }

  def main(args: Array[String]): Unit = {
    val num1: Int = 1500
    val num2: Int = 100
    val result: Int = gcd_2(num1, num2)
    println("gcd of two numbers:" + result)

  }
}
```

```
"C:\Program Files\Java\jdk1.8.0_72\bin\java.exe" ...
x is 1500 y is 100
x is 100 y is 0
gcd of two numbers:100

Process finished with exit code 0
```

Task 2

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

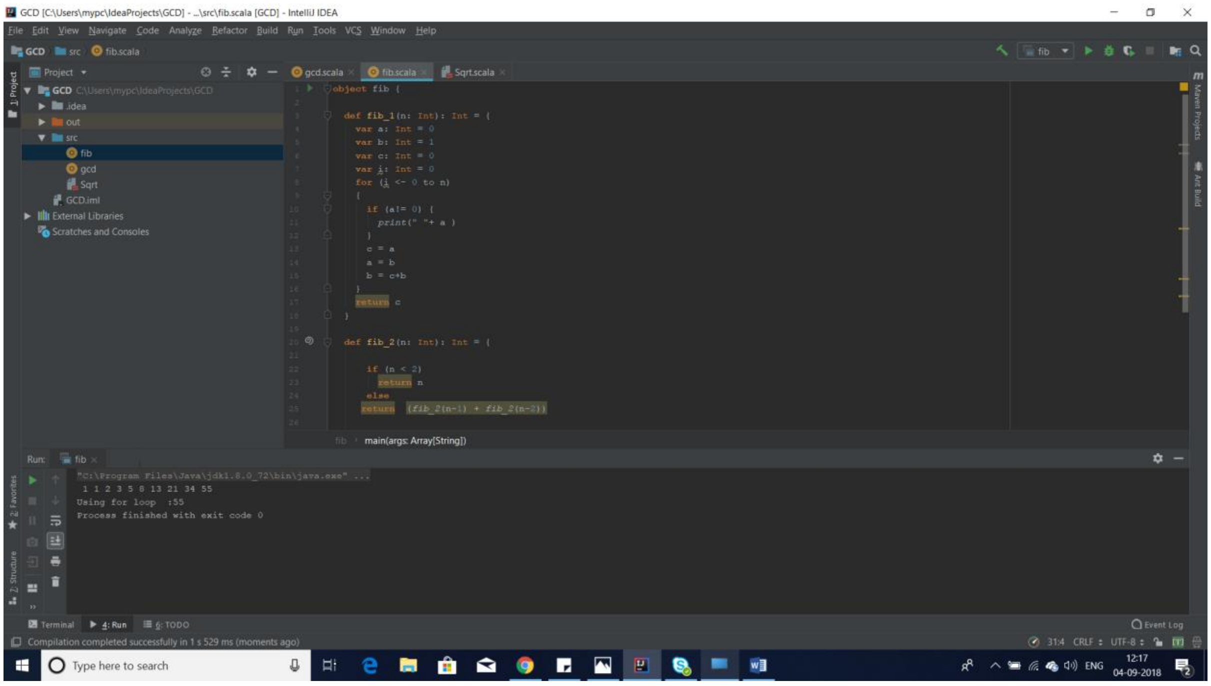
Write a Scala application to find the Nth digit in the sequence.

➢ Write the function using standard for loop

➢ Write the function using recursion

```
object fib {
def  fib_1(n:Int): Int ={
var a :Int = 0
var b :Int =1
var sum  :Int =0
var i :Int =0
for(i <- 0 to n){
if(a!=0){
print(“ “+a)
}
Sum =a+b
a=b
b=sum
}
Return sum
}
def main(args:Array[String]):Int ={
val num1 :Int =10
val result :Int = fib_1(num1)
println(“Using for loop:”+  fib_1(num1))
}
}
```

```
//Using Recursive  Function

def fib_2(n:Int): Int={

if(n<2) return n

else

  return  (fib_2(n-1) + fib_2(n-2))


}

Def main(args:Array[String]):Unit ={

Val num_1 : Int =10

Println(“ Fibonacci numbers using recursive :” +  fib_2(num_1))

}

}
```

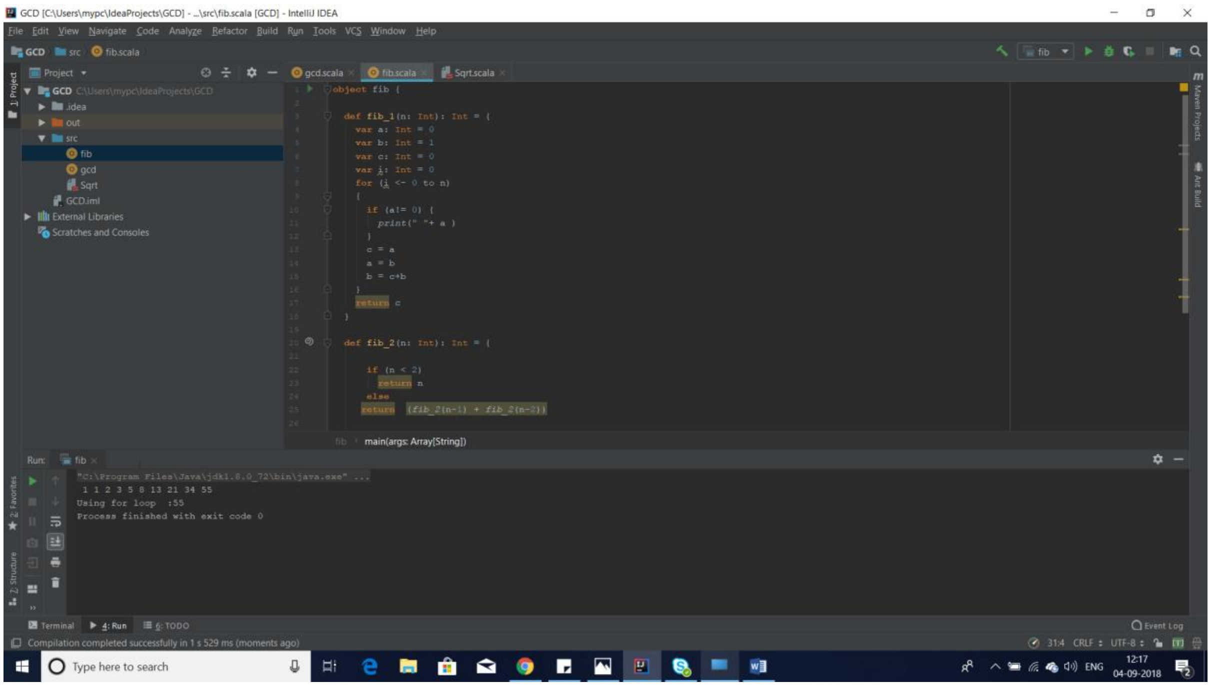


GCD [C:\Users\mypc\IdeaProjects\GCD] - ...\src\fib.scala [GCD] - IntelliJ IDEA

```
object fib {

  def fib_1(n: Int): Int = {
    var a: Int = 0
    var b: Int = 1
    var c: Int = 0
    var i: Int = 0
    for (i <- 0 to n)
    {
      if (a!= 0) {
        print(" "+ a )
      }
      c = a
      a = b
      b = c+b
    }
    return c
  }

  def fib_2(n: Int): Int = {

      if (n < 2)
        return n
      else
     return  (fib_2(n-1) + fib_2(n-2))

```

```
"C:\Program Files\Java\jdk1.8.0_72\bin\java.exe" ...
 1 1 2 3 5 8 13 21 34 55
Using for loop  :55
Process finished with exit code 0
```

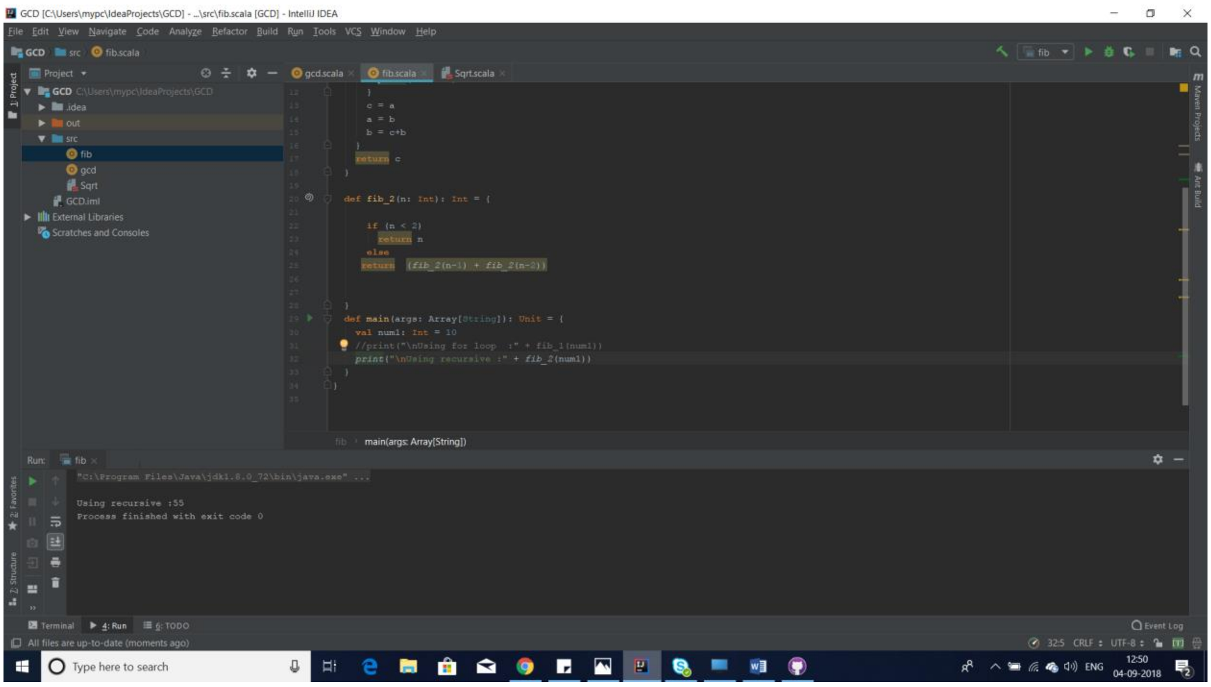
Compilation completed successfully in 1 s 529 ms (moments ago)



```
object fib {

  def fib_1(n: Int): Int = {
    var a: Int = 0
    var b: Int = 1
    var c: Int = 0
    var i: Int = 0
    for (i <- 0 to n)
    {
      if (a!= 0) {
        print(" "+ a )
      }
      c = a
      a = b
      b = c+b
    }
    return c
  }

  def fib_2(n: Int): Int = {

      if (n < 2)
        return n
      else
     return  (fib_2(n-1) + fib_2(n-2))
```

```
"C:\Program Files\Java\jdk1.8.0_72\bin\java.exe" ...
 1 1 2 3 5 8 13 21 34 55
Using for loop  :55
Process finished with exit code 0
```

Compilation completed successfully in 1 s 529 ms (moments ago)



```
      }
      c = a
      a = b
      b = c+b
    }
    return c
  }

  def fib_2(n: Int): Int = {

      if (n < 2)
        return n
      else
     return  (fib_2(n-1) + fib_2(n-2))


  }
  def main(args: Array[String]): Unit = {
    val num1: Int = 10
    //print("\nUsing for loop  :" + fib_1(num1))
    print("\nUsing recursive :" + fib_2(num1))
  }
}
```

```
"C:\Program Files\Java\jdk1.8.0_72\bin\java.exe" ...

Using recursive :55
Process finished with exit code 0
```

All files are up-to-date (moments ago)

Task 3

Find square root of number using Babylonian method.

1. Start with an arbitrary positive start value x (the closer to the root, the better).

2.Initialize y = 1.

3. Do following until desired approximation is achieved.

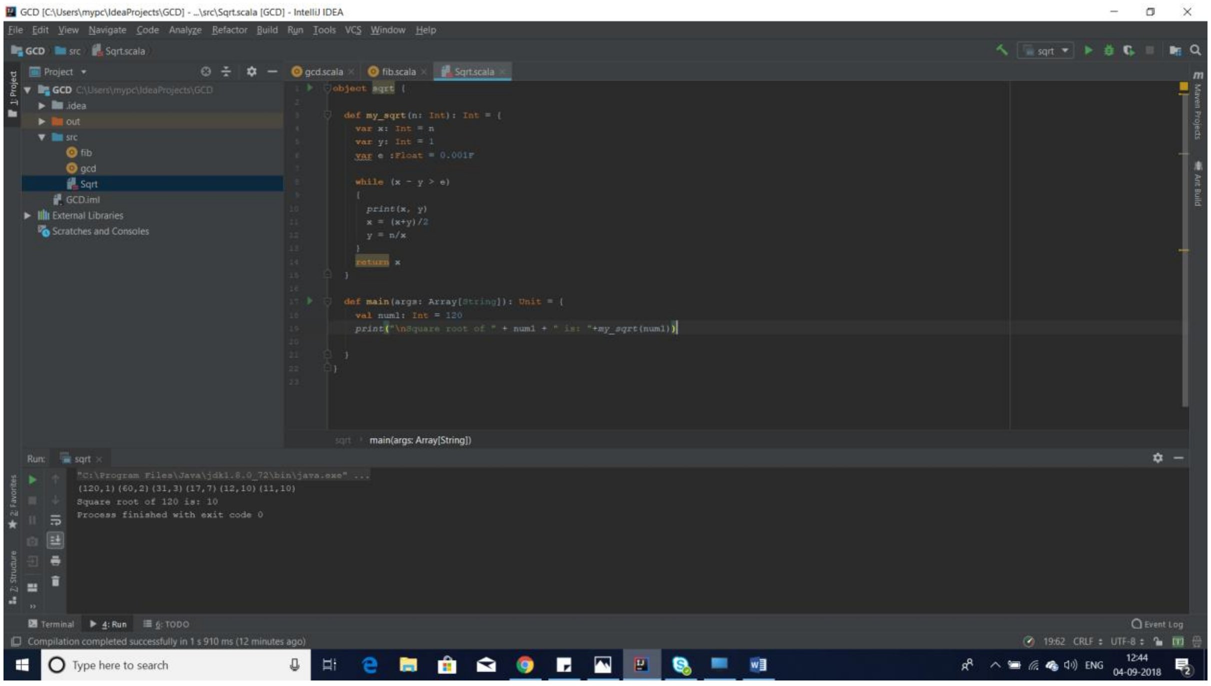
a) Get the next approximation for root using average of x and y

b) Set y = n/x

Solution :

In below code, we have created a new method squareRoot and in this method, we have used WHILE loop and used three Float variables y,x and e with their values as 1, n and 0.001 respectively. Here we have used Babylonian method to find out Square Root. Variable e is used for the accuracy level. Lesser the value of e, more is the accuracy.

```
object sqrt {
def my_sqrt(n : Int) :Int ={


var x :Int =n
var y : Int =1
var e :Float =0.001F
while(x-y>e)


{
Println(x, y)
x= (x+y)/2
y=n/x
}
return x
}
def  main(args :Array[String]):Unit ={
val num_1 = 120
println("square root of num_1 is : "+  my_sqrt(num_1))
}
}
```

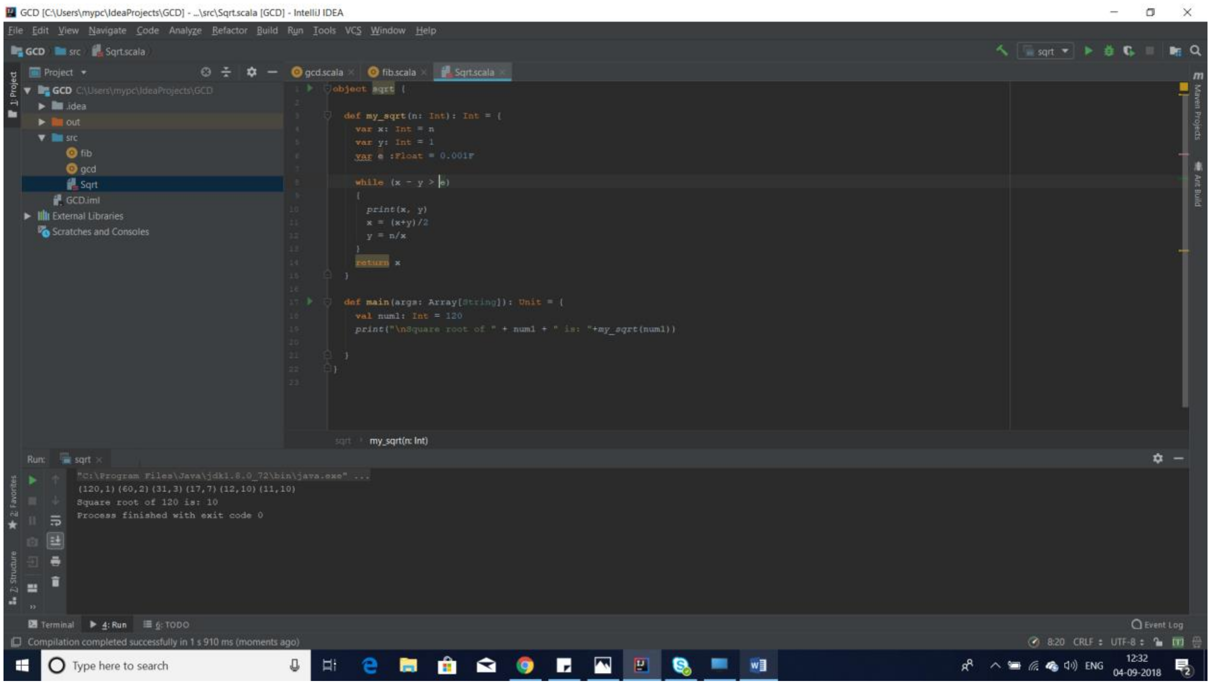


GCD [C:\Users\mypc\IdeaProjects\GCD] - ...\src\Sqrt.scala [GCD] - IntelliJ IDEA

```scala
object sqrt {

  def my_sqrt(n: Int): Int = {
    var x: Int = n
    var y: Int = 1
    var e :Float = 0.001F

    while (x - y > e)
    {
      print(x, y)
      x = (x+y)/2
      y = n/x
    }
    return x
  }

  def main(args: Array[String]): Unit = {
    val num1: Int = 120
    print("\nSquare root of " + num1 + " is: "+my_sqrt(num1))

  }
}
```

```
"C:\Program Files\Java\jdk1.8.0_72\bin\java.exe" ...
(120,1)(60,2)(31,3)(17,7)(12,10)(11,10)
Square root of 120 is: 10
Process finished with exit code 0
```

Compilation completed successfully in 1 s 910 ms (12 minutes ago)



GCD [C:\Users\mypc\IdeaProjects\GCD] - ...\src\Sqrt.scala [GCD] - IntelliJ IDEA

```scala
object sqrt {

  def my_sqrt(n: Int): Int = {
    var x: Int = n
    var y: Int = 1
    var e :Float = 0.001F

    while (x - y > e)
    {
      print(x, y)
      x = (x+y)/2
      y = n/x
    }
    return x
  }

  def main(args: Array[String]): Unit = {
    val num1: Int = 120
    print("\nSquare root of " + num1 + " is: "+my_sqrt(num1))

  }
}
```

```
"C:\Program Files\Java\jdk1.8.0_72\bin\java.exe" ...
(120,1)(60,2)(31,3)(17,7)(12,10)(11,10)
Square root of 120 is: 10
Process finished with exit code 0
```

Compilation completed successfully in 1 s 910 ms (moments ago)