

Practical 3

Aim: Generate a random dataset of 10 numbers and calculate its variance and standard deviation.

Code:

```
import scala.util.Random

import scala.math.sqrt

object StatsCalculator{

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

    // Generate a list of 10 random doubles between 0 and 100
    val data: List[Double] = List.fill(10)(Random.nextDouble() * 100)

    // Print the generated data
    println("Generated Data: " + data.mkString(", "))

    // Calculate the mean
    val mean: Double = data.sum / data.length

    // Calculate variance
    val variance: Double = data.map(x => math.pow(x - mean, 2)).sum /
data.length

    // Calculate standard deviation
    val stdDev: Double = sqrt(variance)
```

```
// Print results

println(f"Mean: $mean%.2f")

println(f"Variance: $variance%.2f")

println(f"Standard Deviation: $stdDev%.2f")

}

}
```

This Program Describes:

- 1. Generate a random dataset** using `Random.nextDouble()` to simulate real-world numerical data.
- 2. Create a list of values** using `List.fill(10)(...)` to hold 10 random numbers.
- 3. Compute the mean** of the dataset by:
 - o Summing all the elements using `.sum`
 - o Dividing the total by the number of elements using `.length`
- 4. Calculate variance** by:
 - o Subtracting the mean from each value
 - o Squaring the differences
 - o Taking the average of those squared differences
- 5. Calculate standard deviation** by taking the **square root** of the variance using `math.sqrt(...)`.
- 6. Use Scala collection methods** like `map`, `sum`, and `length` to apply transformations and statistical operations.
- 7. Understand data variability** by interpreting the variance and standard deviation results, which describe how spread out the numbers are.

Output:

```
C:\Users\Admin\scala-3-project-template>sbt
[info] welcome to sbt 1.11.2 (Oracle Corporation Java 1.8.0_333)
[info] loading project definition from C:\Users\Admin\scala-3-project-template\project
[info] loading settings for project root from build.sbt...
[info] set current project to Scala 3 Project Template (in build file:/C:/Users/Admin/scala-3-project-template/)
[info] sbt server started at local:sbt-server-65f24358ab70a8eae265
[info] started sbt server
sbt:Scala 3 Project Template> run
[info] compiling 1 Scala source to C:\Users\Admin\scala-3-project-template\target\scala-3.7.1\classes ...
[info] running StatsCalculator
Generated Data: 33.71994624250163, 69.84299920281019, 44.44639866618088, 38.392326251234024, 78.77862546240141, 89.06612
07452644, 29.792189622867802, 7.6536913445206745, 44.54534063198975, 42.46396732262252
Mean: 47.87
Variance: 542.15
Standard Deviation: 23.28
[success] Total time: 3 s, completed 1 Jul, 2025 1:57:07 PM
sbt:Scala 3 Project Template>
```