**A2.2ScalaPartI**

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## IFT 512: **Advanced Analytics Big Data/AI**

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**Script:**

type D = Double

type I = Integer

type V = Vector[D]

//Mean

def mean(v: V): D = v.sum / v.size

//Centered Vector

def centeredVector(v: V): V = {

val meanValue = mean(v)

v.map(\_ - meanValue)

}

// Dot Product

def dot(v: V, w: V): D = (v zip w).map { case (x, y) => x \* y }.sum

// Norm

def norm(v: V): D = math.sqrt(v.map(x => x \* x).sum)

// Variance

def variance(v: V): D = {

val vMean = mean(v)

v.map(x => math.pow(x - vMean, 2)).sum / v.size

}

// Standard Deviation

def std(v: V): D = math.sqrt(variance(v))

// Correlation

def correlation(v: V, w: V): D = {

val centeredV = centeredVector(v)

val centeredW = centeredVector(w)

dot(centeredV, centeredW) / (norm(centeredV) \* norm(centeredW))

}

val v1 = Vector(3.0, 4.0, 5.0)

val w1 = Vector(6.0, 9.0, 15.0)

println(s"Mean of v1: ${mean(v1)}")

println(s"Centered vector v1: ${centeredVector(v1)}")

println(s"Dot product of v1 and w1: ${dot(v1, w1)}")

println(s"Norm of v1: ${norm(v1)}")

println(s"Variance of v1: ${variance(v1)}")

println(s"Standard deviation of v1: ${std(v1)}")

println(s"Correlation of v1 and w1: ${correlation(v1, w1)}")

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