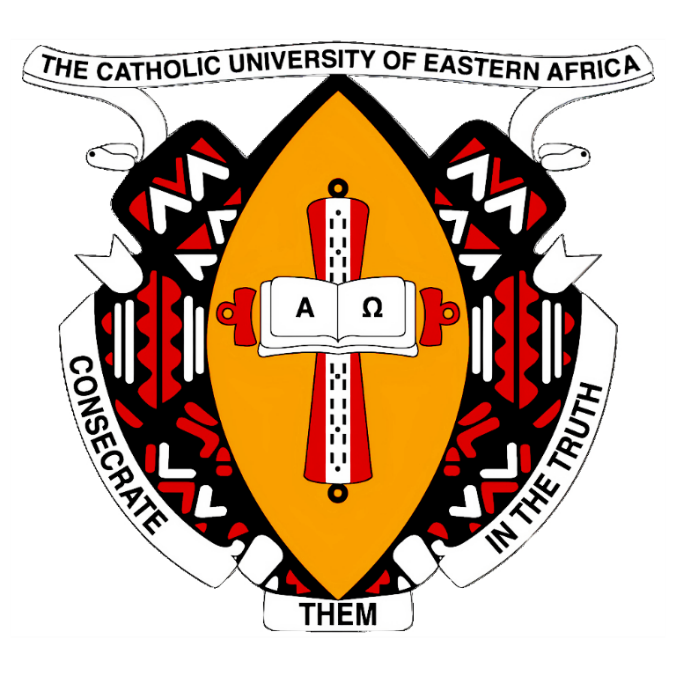
**THE CATHOLIC UNIVERSITY OF EASTERN AFRICA**



**FACULTY OF SCIENCE**

**DEPARTMENT OF COMPUTER AND INFORMATION SCIENCE**

**CMT 432-INTRODUCTION TO APACHE SPARK**

**PRACTICE EXERCISES ON SCALA COLLECTIONS**

**ALLAN SILOMA PARSEEN**

**REG. NO:1046043**

**a)Array buffer**

import scala.collection.mutable.ArrayBuffer

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

case class StMarks(name: String, gender: String, cat1: Int,cat2: Int,exam: Int)

def sum(m1:Int,m2:Int,m3:Int): Int={ m1+m2+m3}

def grade(mark:Int): String={if( mark >= 70 )"A"

else if( mark >= 60 )"B" else if( mark >= 50 )"C"else if( mark >= 40 )"D" else "F"

}

val Marks = ArrayBuffer[StMarks]()

Marks +=StMarks("Faith","F",9,11,33)

Marks ++=List(StMarks("Joyce","F",5,18,35),StMarks("John","M",7,8,28),StMarks("Joseph","M",8,12,38))

println( "Head of Marks List : " + Marks.head )

Marks.foreach(println)

Marks.foreach(m=>println(m.name))

Marks.foreach(m=>println(m.cat1+m.cat2+m.exam))

Marks.foreach(m=>println(m.name+"\t"+(Integer.valueOf(m.cat1)+Integer.valueOf(m.cat2)+Integer.valueOf(m.exam))))

Marks.foreach(m=>println(m.name+"\t"+grade(sum(Integer.valueOf(m.cat1),Integer.valueOf(m.cat2),Integer.valueOf(m.exam)))))

Marks.foreach(m=>println(m.name+"\t"+sum(Integer.valueOf(m.cat1),Integer.valueOf(m.cat2),Integer.valueOf(m.exam))

+"\t"+grade(sum(Integer.valueOf(m.cat1),Integer.valueOf(m.cat2),Integer.valueOf(m.exam)))))

}

}

**b)List**

object Stmarks\_list{

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

// Case class for student marks

case class StMarks(name: String, gender: String, cat1: Int, cat2: Int, exam: Int)

// Function to calculate sum of marks

def sum(m1: Int, m2: Int, m3: Int): Int = {

m1 + m2 + m3

}

// Function to determine grade based on total marks

def grade(mark: Int): String = {

if (mark >= 70) "A"

else if (mark >= 60) "B"

else if (mark >= 50) "C"

else if (mark >= 40) "D"

else "F"

}

// Initializing a List of student marks

var Marks: List[StMarks] = List(

StMarks("Faith", "F", 9, 11, 33)

)

// Adding more students to the List

Marks = Marks ++ List(

StMarks("Joyce", "F", 5, 18, 35),

StMarks("John", "M", 7, 8, 28),

StMarks("Joseph", "M", 8, 12, 38),

StMarks("Joseph", "M", 8, 12, 38),

StMarks("David", "M", 10, 10, 40),

StMarks("Mary", "F", 12, 15, 45),

StMarks("James", "M", 9, 12, 50),

StMarks("Elizabeth", "F", 0, 18, 60),

StMarks("Grace", "F", 9, 10, 33),

StMarks("Peter", "M", 13, 15, 48),

StMarks("Susan", "F", 11, 9, 40),

StMarks("Michael", "M", 17, 19, 50),

StMarks("George", "M", 5, 6, 25),

StMarks("Angela", "F", 4, 10, 12),

StMarks("Matthew", "M", 9, 8, 30),

StMarks("Rachel", "F", 11, 9, 56)

)

// Printing the first item of the list

println("The first element of the list is:")

println("Head of Marks List: " + Marks.head)

// Printing all elements in the list

println("All elements of the list:")

Marks.foreach(println)

// Printing names of students

println("The name of the students:")

Marks.foreach(m => println(m.name))

// Printing the total marks for each student

println("Total marks for each student:")

Marks.foreach(m => println(m.cat1 + m.cat2 + m.exam))

// Printing name and total marks

println("Name amd total marks for each student:")

Marks.foreach(m => println(m.name + "\t" + (m.cat1 + m.cat2 + m.exam)))

// Printing name and grade for each student

println("Name and grade for each student:")

Marks.foreach(m => println(m.name + "\t" + grade(sum(m.cat1, m.cat2, m.exam))))

// Printing name, total marks, and grade for each student

println("Name, total marks and grade for each student:")

Marks.foreach(m => println(m.name + "\t" + sum(m.cat1, m.cat2, m.exam) + "\t" + grade(sum(m.cat1, m.cat2, m.exam))))

}

}

**c)Set**

object Stmarks\_set {

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

// Case class for student marks

case class StMarks(name: String, gender: String, cat1: Int, cat2: Int, exam: Int)

// Function to calculate sum of marks

def sum(m1: Int, m2: Int, m3: Int): Int = {

m1 + m2 + m3

}

// Function to determine grade based on total marks

def grade(mark: Int): String = {

if (mark >= 70) "A"

else if (mark >= 60) "B"

else if (mark >= 50) "C"

else if (mark >= 40) "D"

else "F"

}

// Initializing a Set of student marks

var Marks: Set[StMarks] = Set(

StMarks("Faith", "F", 9, 11, 33)

)

// Adding more students to the Set

Marks = Marks ++ Set(

StMarks("Joyce", "F", 5, 18, 35),

StMarks("John", "M", 7, 8, 28),

StMarks("Joseph", "M", 8, 12, 38),

StMarks("David", "M", 10, 10, 40),

StMarks("Mary", "F", 12, 15, 45),

StMarks("James", "M", 9, 12, 50),

StMarks("Elizabeth", "F", 0, 18, 60),

StMarks("Grace", "F", 9, 10, 33),

StMarks("Peter", "M", 13, 15, 48),

StMarks("Susan", "F", 11, 9, 40),

StMarks("Michael", "M", 17, 19, 50),

StMarks("George", "M", 5, 6, 25),

StMarks("Angela", "F", 4, 10, 12),

StMarks("Matthew", "M", 9, 8, 30),

StMarks("Rachel", "F", 11, 9, 56)

)

// Printing the first item of the set

println("The first element of the set is:")

println("Head of Marks Set: " + Marks.head)

// Printing all elements in the set

println("All elements of the set:")

Marks.foreach(println)

// Printing names of students

println("The name of the students:")

Marks.foreach(m => println(m.name))

// Printing the total marks for each student

println("Total marks for each student:")

Marks.foreach(m => println(m.cat1 + m.cat2 + m.exam))

// Printing name and total marks

println("Name and total marks for each student:")

Marks.foreach(m => println(m.name + "\t" + (m.cat1 + m.cat2 + m.exam)))

// Printing name and grade for each student

println("Name and grade for each student:")

Marks.foreach(m => println(m.name + "\t" + grade(sum(m.cat1, m.cat2, m.exam))))

// Printing name, total marks, and grade for each student

println("Name, total marks and grade for each student:")

Marks.foreach(m => println(m.name + "\t" + sum(m.cat1, m.cat2, m.exam) + "\t" + grade(sum(m.cat1, m.cat2, m.exam))))

}

}

**d)Sequence**

object Stmarks\_sequence {

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

// Case class for student marks

case class StMarks(name: String, gender: String, cat1: Int, cat2: Int, exam: Int)

// Function to calculate sum of marks

def sum(m1: Int, m2: Int, m3: Int): Int = {

m1 + m2 + m3

}

// Function to determine grade based on total marks

def grade(mark: Int): String = {

if (mark >= 70) "A"

else if (mark >= 60) "B"

else if (mark >= 50) "C"

else if (mark >= 40) "D"

else "F"

}

// Initializing a Sequence of student marks

var Marks: Seq[StMarks] = Seq(

StMarks("Faith", "F", 9, 11, 33)

)

// Adding more students to the Sequence

Marks = Marks ++ Seq(

StMarks("Joyce", "F", 5, 18, 35),

StMarks("John", "M", 7, 8, 28),

StMarks("Joseph", "M", 8, 12, 38),

StMarks("David", "M", 10, 10, 40),

StMarks("Mary", "F", 12, 15, 45),

StMarks("James", "M", 9, 12, 50),

StMarks("Elizabeth", "F", 0, 18, 60),

StMarks("Grace", "F", 9, 10, 33),

StMarks("Peter", "M", 13, 15, 48),

StMarks("Susan", "F", 11, 9, 40),

StMarks("Michael", "M", 17, 19, 50),

StMarks("George", "M", 5, 6, 25),

StMarks("Angela", "F", 4, 10, 12),

StMarks("Matthew", "M", 9, 8, 30),

StMarks("Rachel", "F", 11, 9, 56)

)

// Printing the first item of the sequence

println("The first element of the sequence is:")

println("Head of Marks Sequence: " + Marks.head)

// Printing all elements in the sequence

println("All elements of the sequence:")

Marks.foreach(println)

// Printing names of students

println("The name of the students:")

Marks.foreach(m => println(m.name))

// Printing the total marks for each student

println("Total marks for each student:")

Marks.foreach(m => println(m.cat1 + m.cat2 + m.exam))

// Printing name and total marks

println("Name and total marks for each student:")

Marks.foreach(m => println(m.name + "\t" + (m.cat1 + m.cat2 + m.exam)))

// Printing name and grade for each student

println("Name and grade for each student:")

Marks.foreach(m => println(m.name + "\t" + grade(sum(m.cat1, m.cat2, m.exam))))

// Printing name, total marks, and grade for each student

println("Name, total marks and grade for each student:")

Marks.foreach(m => println(m.name + "\t" + sum(m.cat1, m.cat2, m.exam) + "\t" + grade(sum(m.cat1, m.cat2, m.exam))))

}

}

**e)Map**

object Stmarks\_map {

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

// Case class for student marks

case class StMarks(name: String, gender: String, cat1: Int, cat2: Int, exam: Int)

// Function to calculate sum of marks

def sum(m1: Int, m2: Int, m3: Int): Int = {

m1 + m2 + m3

}

// Function to determine grade based on total marks

def grade(mark: Int): String = {

if (mark >= 70) "A"

else if (mark >= 60) "B"

else if (mark >= 50) "C"

else if (mark >= 40) "D"

else "F"

}

// Initializing a Map of student marks where key is the student number

var Marks: Map[Int, StMarks] = Map(

1 -> StMarks("Faith", "F", 9, 11, 33)

)

// Adding more students to the Map

Marks = Marks ++ Map(

2 -> StMarks("Joyce", "F", 5, 18, 35),

3 -> StMarks("John", "M", 7, 8, 28),

4 -> StMarks("Joseph", "M", 8, 12, 38),

5 -> StMarks("David", "M", 10, 10, 40),

6 -> StMarks("Mary", "F", 12, 15, 45),

7 -> StMarks("James", "M", 9, 12, 50),

8 -> StMarks("Elizabeth", "F", 0, 18, 60),

9 -> StMarks("Grace", "F", 9, 10, 33),

10 -> StMarks("Peter", "M", 13, 15, 48),

11 -> StMarks("Susan", "F", 11, 9, 40),

12 -> StMarks("Michael", "M", 17, 19, 50),

13 -> StMarks("George", "M", 5, 6, 25),

14 -> StMarks("Angela", "F", 4, 10, 12),

15 -> StMarks("Matthew", "M", 9, 8, 30),

16 -> StMarks("Rachel", "F", 11, 9, 56)

)

println("\n This is a map!!")

// Printing the first item of the map

println("The first element of the map is:")

println("Head of Marks Map: " + Marks.head)

// Printing all elements in the map

println("All elements of the map:")

Marks.foreach(println)

// Printing student numbers and names

println("The student number and names:")

Marks.foreach { case (num, student) => println(s"Student Number: $num, Name: ${student.name}") }

// Printing the total marks for each student

println("Total marks for each student:")

Marks.foreach { case (\_, student) => println(sum(student.cat1, student.cat2, student.exam)) }

// Printing student number, name, and total marks

println("Student Number, Name, and Total Marks for each student:")

Marks.foreach { case (num, student) => println(s"$num\t${student.name}\t${sum(student.cat1, student.cat2, student.exam)}") }

// Printing student number, name, and grade for each student

println("Student Number, Name, and Grade for each student:")

Marks.foreach { case (num, student) => println(s"$num\t${student.name}\t${grade(sum(student.cat1, student.cat2, student.exam))}") }

// Printing student number, name, total marks, and grade for each student

println("Student Number, Name, Total Marks and Grade for each student:")

Marks.foreach { case (num, student) =>

val totalMarks = sum(student.cat1, student.cat2, student.exam)

println(s"$num\t${student.name}\t$totalMarks\t${grade(totalMarks)}")

}

}

}