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Name: Krish Agarwal  
Registration Number: 21112016  
Class: 2BSc DS A  
R for Analytics  
Lab 3

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Q1)

```
zeroes <- rep(0, times = 40)
Student_report <- matrix(zeroes, nrow = 40, ncol = 5)
Student_report
```

```
##      [,1] [,2] [,3] [,4] [,5]
## [1,]    0    0    0    0    0
## [2,]    0    0    0    0    0
## [3,]    0    0    0    0    0
## [4,]    0    0    0    0    0
## [5,]    0    0    0    0    0
## [6,]    0    0    0    0    0
## [7,]    0    0    0    0    0
## [8,]    0    0    0    0    0
## [9,]    0    0    0    0    0
## [10,]   0    0    0    0    0
## [11,]   0    0    0    0    0
## [12,]   0    0    0    0    0
## [13,]   0    0    0    0    0
## [14,]   0    0    0    0    0
## [15,]   0    0    0    0    0
## [16,]   0    0    0    0    0
## [17,]   0    0    0    0    0
## [18,]   0    0    0    0    0
## [19,]   0    0    0    0    0
## [20,]   0    0    0    0    0
## [21,]   0    0    0    0    0
## [22,]   0    0    0    0    0
## [23,]   0    0    0    0    0
## [24,]   0    0    0    0    0
## [25,]   0    0    0    0    0
## [26,]   0    0    0    0    0
## [27,]   0    0    0    0    0
## [28,]   0    0    0    0    0
## [29,]   0    0    0    0    0
## [30,]   0    0    0    0    0
## [31,]   0    0    0    0    0
## [32,]   0    0    0    0    0
## [33,]   0    0    0    0    0
## [34,]   0    0    0    0    0
## [35,]   0    0    0    0    0
## [36,]   0    0    0    0    0
## [37,]   0    0    0    0    0
## [38,]   0    0    0    0    0
## [39,]   0    0    0    0    0
```

```
## [40,]    0    0    0    0    0
```

Q2)

```
set.seed(25)
reg_vec <- seq(from = 2201001, to = 2201050)
registration_numbers <- sample(reg_vec, 40)
```

Q3)

```
set.seed(25)
class_vec <- seq(from = 160, to = 380)

classes <- sample(class_vec, 40, replace = T)
```

Q4)

```
att_vec <- (classes/380)*100
Attendance <- array(att_vec)
```

Q5)

```
set.seed(25)

bucket1 <- c("Python", "R", "Java")
bucket2 <- c("Stochastic", "IoT", "Econometrics")

bucket1f <- sample(bucket1, 40, replace = T)
bucket2f <- sample(bucket2, 40, replace = T)
```

Q6)

```
dummy_matrix <- matrix(c(registration_numbers, classes, Attendance, bucket1f, bucket2f), nrow = 40, ncol = 5)
Student_report <- dummy_matrix
Student_report
```

```
##      [,1]      [,2] [,3]      [,4]      [,5]
## [1,] "2201007" "294" "77.3684210526316" "Java"  "IoT"
## [2,] "2201029" "380" "100"          "Python" "Stochastic"
## [3,] "2201024" "183" "48.1578947368421" "Python" "IoT"
## [4,] "2201025" "347" "91.3157894736842" "Python" "Econometrics"
## [5,] "2201008" "376" "98.9473684210526" "Python" "Econometrics"
## [6,] "2201041" "208" "54.7368421052632" "R"      "Econometrics"
## [7,] "2201026" "231" "60.7894736842105" "Java"   "Stochastic"
## [8,] "2201016" "264" "69.4736842105263" "R"      "IoT"
## [9,] "2201036" "185" "48.6842105263158" "Python" "Econometrics"
## [10,] "2201001" "218" "57.3684210526316" "Java"   "Econometrics"
## [11,] "2201046" "175" "46.0526315789474" "Python" "IoT"
## [12,] "2201003" "259" "68.1578947368421" "R"      "Econometrics"
## [13,] "2201048" "352" "92.6315789473684" "Java"   "IoT"
## [14,] "2201034" "167" "43.9473684210526" "Java"   "IoT"
```

```
## [15,] "2201047" "354" "93.1578947368421" "Python" "Econometrics"
## [16,] "2201011" "200" "52.6315789473684" "Python" "IoT"
## [17,] "2201049" "267" "70.2631578947368" "R" "Stochastic"
## [18,] "2201005" "183" "48.1578947368421" "Python" "Econometrics"
## [19,] "2201039" "345" "90.7894736842105" "Java" "Stochastic"
## [20,] "2201033" "266" "70" "Python" "IoT"
## [21,] "2201030" "270" "71.0526315789474" "Python" "Stochastic"
## [22,] "2201037" "340" "89.4736842105263" "Python" "Econometrics"
## [23,] "2201004" "280" "73.6842105263158" "Python" "Econometrics"
## [24,] "2201013" "343" "90.2631578947368" "Java" "IoT"
## [25,] "2201028" "312" "82.1052631578947" "Python" "Stochastic"
## [26,] "2201040" "362" "95.2631578947368" "R" "Econometrics"
## [27,] "2201032" "271" "71.3157894736842" "Python" "Stochastic"
## [28,] "2201012" "348" "91.5789473684211" "Python" "IoT"
## [29,] "2201014" "264" "69.4736842105263" "Python" "IoT"
## [30,] "2201017" "316" "83.1578947368421" "Java" "Econometrics"
## [31,] "2201023" "164" "43.1578947368421" "R" "Econometrics"
## [32,] "2201009" "162" "42.6315789473684" "R" "Stochastic"
## [33,] "2201018" "260" "68.4210526315789" "Java" "Econometrics"
## [34,] "2201043" "253" "66.5789473684211" "Python" "Stochastic"
## [35,] "2201019" "348" "91.5789473684211" "Python" "IoT"
## [36,] "2201022" "163" "42.8947368421053" "Python" "Stochastic"
## [37,] "2201020" "332" "87.3684210526316" "R" "IoT"
## [38,] "2201042" "188" "49.4736842105263" "Python" "Econometrics"
## [39,] "2201021" "291" "76.5789473684211" "R" "IoT"
## [40,] "2201002" "199" "52.3684210526316" "Python" "Econometrics"
```

Q7)

```
row_name <- paste("Student", 1:40, sep = "_")
rownames(Student_report) <- row_name
```

Q8)

```
penalty <- (100 - Attendance)*180

cbind(Student_report, penalty) -> Student_report

colnames(Student_report) <- c("Registration Nums", "Classes Attended", "Attendance", "Elective 1", "Elective 2")

Student_report
```

	Registration Nums	Classes Attended	Attendance	Elective 1
## Student_1	"2201007"	"294"	"77.3684210526316"	"Java"
## Student_2	"2201029"	"380"	"100"	"Python"
## Student_3	"2201024"	"183"	"48.1578947368421"	"Python"
## Student_4	"2201025"	"347"	"91.3157894736842"	"Python"
## Student_5	"2201008"	"376"	"98.9473684210526"	"Python"
## Student_6	"2201041"	"208"	"54.7368421052632"	"R"
## Student_7	"2201026"	"231"	"60.7894736842105"	"Java"
## Student_8	"2201016"	"264"	"69.4736842105263"	"R"
## Student_9	"2201036"	"185"	"48.6842105263158"	"Python"
## Student_10	"2201001"	"218"	"57.3684210526316"	"Java"

## Student_11	"2201046"	"175"	"46.0526315789474"	"Python"
## Student_12	"2201003"	"259"	"68.1578947368421"	"R"
## Student_13	"2201048"	"352"	"92.6315789473684"	"Java"
## Student_14	"2201034"	"167"	"43.9473684210526"	"Java"
## Student_15	"2201047"	"354"	"93.1578947368421"	"Python"
## Student_16	"2201011"	"200"	"52.6315789473684"	"Python"
## Student_17	"2201049"	"267"	"70.2631578947368"	"R"
## Student_18	"2201005"	"183"	"48.1578947368421"	"Python"
## Student_19	"2201039"	"345"	"90.7894736842105"	"Java"
## Student_20	"2201033"	"266"	"70"	"Python"
## Student_21	"2201030"	"270"	"71.0526315789474"	"Python"
## Student_22	"2201037"	"340"	"89.4736842105263"	"Python"
## Student_23	"2201004"	"280"	"73.6842105263158"	"Python"
## Student_24	"2201013"	"343"	"90.2631578947368"	"Java"
## Student_25	"2201028"	"312"	"82.1052631578947"	"Python"
## Student_26	"2201040"	"362"	"95.2631578947368"	"R"
## Student_27	"2201032"	"271"	"71.3157894736842"	"Python"
## Student_28	"2201012"	"348"	"91.5789473684211"	"Python"
## Student_29	"2201014"	"264"	"69.4736842105263"	"Python"
## Student_30	"2201017"	"316"	"83.1578947368421"	"Java"
## Student_31	"2201023"	"164"	"43.1578947368421"	"R"
## Student_32	"2201009"	"162"	"42.6315789473684"	"R"
## Student_33	"2201018"	"260"	"68.4210526315789"	"Java"
## Student_34	"2201043"	"253"	"66.5789473684211"	"Python"
## Student_35	"2201019"	"348"	"91.5789473684211"	"Python"
## Student_36	"2201022"	"163"	"42.8947368421053"	"Python"
## Student_37	"2201020"	"332"	"87.3684210526316"	"R"
## Student_38	"2201042"	"188"	"49.4736842105263"	"Python"
## Student_39	"2201021"	"291"	"76.5789473684211"	"R"
## Student_40	"2201002"	"199"	"52.3684210526316"	"Python"
##	Elective 2	Penalty		
## Student_1	"IoT"	"4073.68421052632"		
## Student_2	"Stochastic"	"0"		
## Student_3	"IoT"	"9331.57894736842"		
## Student_4	"Econometrics"	"1563.15789473684"		
## Student_5	"Econometrics"	"189.473684210527"		
## Student_6	"Econometrics"	"8147.36842105263"		
## Student_7	"Stochastic"	"7057.8947368421"		
## Student_8	"IoT"	"5494.73684210526"		
## Student_9	"Econometrics"	"9236.84210526316"		
## Student_10	"Econometrics"	"7673.68421052631"		
## Student_11	"IoT"	"9710.52631578947"		
## Student_12	"Econometrics"	"5731.57894736842"		
## Student_13	"IoT"	"1326.31578947368"		
## Student_14	"IoT"	"10089.4736842105"		
## Student_15	"Econometrics"	"1231.57894736842"		
## Student_16	"IoT"	"8526.31578947369"		
## Student_17	"Stochastic"	"5352.63157894737"		
## Student_18	"Econometrics"	"9331.57894736842"		
## Student_19	"Stochastic"	"1657.8947368421"		
## Student_20	"IoT"	"5400"		
## Student_21	"Stochastic"	"5210.52631578947"		
## Student_22	"Econometrics"	"1894.73684210526"		
## Student_23	"Econometrics"	"4736.84210526316"		

```
## Student_24 "IoT"          "1752.63157894737"
## Student_25 "Stochastic"   "3221.05263157895"
## Student_26 "Econometrics" "852.63157894737"
## Student_27 "Stochastic"   "5163.15789473684"
## Student_28 "IoT"          "1515.78947368421"
## Student_29 "IoT"          "5494.73684210526"
## Student_30 "Econometrics" "3031.57894736842"
## Student_31 "Econometrics" "10231.5789473684"
## Student_32 "Stochastic"   "10326.3157894737"
## Student_33 "Econometrics" "5684.21052631579"
## Student_34 "Stochastic"   "6015.78947368421"
## Student_35 "IoT"          "1515.78947368421"
## Student_36 "Stochastic"   "10278.9473684211"
## Student_37 "IoT"          "2273.68421052631"
## Student_38 "Econometrics" "9094.73684210526"
## Student_39 "IoT"          "4215.78947368421"
## Student_40 "Econometrics" "8573.68421052632"
```

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#### Additional Questions (by Group5)

Q1) Find the total numbers of classes attended by all the students in each of the electives of bucketlist1.

```
r num_class<- as.numeric(Student_report[,2]) tapply(num_class, bucket1f, sum)
```

```
##   Java Python      R ##   2526   5885   2309
```

Q2) Find the student IDs and number of classes attended by the students who have no penalties

```
r Student_report[Student_report[,6]==0, ]
```

```
## Registration Nums  Classes Attended      Attendance      Elective 1 ##
"2201029"             "380"             "100"             "Python" ##      Elective 2
Penalty ##           "Stochastic"             "0"
```

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#### Additional Questions (Our Group Questions)

Q1) Students with attendance smaller than 69%, print their electives.

```
Student_report[as.numeric(Student_report[,3])<69, c(4,5)]
```

```
##           Elective 1 Elective 2
## Student_3  "Python"   "IoT"
## Student_6  "R"        "Econometrics"
## Student_7  "Java"     "Stochastic"
## Student_9  "Python"   "Econometrics"
## Student_10 "Java"     "Econometrics"
## Student_11 "Python"   "IoT"
## Student_12 "R"        "Econometrics"
## Student_14 "Java"     "IoT"
## Student_16 "Python"   "IoT"
## Student_18 "Python"   "Econometrics"
## Student_31 "R"        "Econometrics"
## Student_32 "R"        "Stochastic"
## Student_33 "Java"     "Econometrics"
## Student_34 "Python"   "Stochastic"
## Student_36 "Python"   "Stochastic"
## Student_38 "Python"   "Econometrics"
## Student_40 "Python"   "Econometrics"
```

Q2) Print the number of students with penalty less than 4000.

```
Student_report[as.numeric(Student_report[,6])<4000, ]
```

##		Registration Num	Classes Attended	Attendance	Elective 1
## Student_2	"2201029"	"380"	"100"	"Python"	
## Student_4	"2201025"	"347"	"91.3157894736842"	"Python"	
## Student_5	"2201008"	"376"	"98.9473684210526"	"Python"	
## Student_13	"2201048"	"352"	"92.6315789473684"	"Java"	
## Student_15	"2201047"	"354"	"93.1578947368421"	"Python"	
## Student_19	"2201039"	"345"	"90.7894736842105"	"Java"	
## Student_22	"2201037"	"340"	"89.4736842105263"	"Python"	
## Student_24	"2201013"	"343"	"90.2631578947368"	"Java"	
## Student_25	"2201028"	"312"	"82.1052631578947"	"Python"	
## Student_26	"2201040"	"362"	"95.2631578947368"	"R"	
## Student_28	"2201012"	"348"	"91.5789473684211"	"Python"	
## Student_30	"2201017"	"316"	"83.1578947368421"	"Java"	
## Student_35	"2201019"	"348"	"91.5789473684211"	"Python"	
## Student_37	"2201020"	"332"	"87.3684210526316"	"R"	
##	Elective 2	Penalty			
## Student_2	"Stochastic"	"0"			
## Student_4	"Econometrics"	"1563.15789473684"			
## Student_5	"Econometrics"	"189.473684210527"			
## Student_13	"IoT"	"1326.31578947368"			
## Student_15	"Econometrics"	"1231.57894736842"			
## Student_19	"Stochastic"	"1657.8947368421"			
## Student_22	"Econometrics"	"1894.73684210526"			
## Student_24	"IoT"	"1752.63157894737"			
## Student_25	"Stochastic"	"3221.05263157895"			
## Student_26	"Econometrics"	"852.63157894737"			
## Student_28	"IoT"	"1515.78947368421"			
## Student_30	"Econometrics"	"3031.57894736842"			
## Student_35	"IoT"	"1515.78947368421"			
## Student_37	"IoT"	"2273.68421052631"			