R Programming

13. R Workspace and Dataset

```
 # i. Workspace functions
ls()
rm(list = ls())
getwd()
save.image("workspace.RData")
load("workspace.RData")

# ii. Student info
roll_no <- 1
name <- "Rahul"
marks <- c(80, 75, 70, 90, 85)
total <- sum(marks)
percentage <- total / 5
cat("Roll No:", roll_no, "Name:", name, "Total:", total, "Percentage:", percentage)

# iii. Built-in dataset
data()
summary(mtcars)
plot(mtcars$mpg, mtcars$hp)
```

14. Reading & Writing CSV

```
# i.
write.csv(data.frame(roll_no=1:3, name=c("A", "B", "C"), percentage=c(70,80,90)), "students.csv")
students <- read.csv("students.csv")
print(students)

# ii.
df <- data.frame(roll_no=1:3, name=c("A", "B", "C"), percentage=c(70,80,90))
write.csv(df, "output.csv")
```

15. Subset Filtering

```
# i.
students <- data.frame(roll_no=1:5, name=LETTERS[1:5], percentage=c(30, 45, 60, 75, 90))
```

```
subset(students, percentage < 40) # Fail
subset(students, percentage >= 40 & percentage < 50) # Pass
subset(students, percentage >= 50 & percentage < 60) # Second
subset(students, percentage >= 60 & percentage < 75) # First
subset(students, percentage >= 75) # Distinction

# ii.
emp <- data.frame(empid=1:3, name=c("A","B","C"), designation=c("Manager","Clerk","Executive"), salary=c(40000,25000,32000))
subset(emp, salary > 30000, select = -designation)
```

16. Merge Data Frames

```
# i.
df1 <- data.frame(exam_no=1:3, name=c("A","B","C"))
df2 <- data.frame(exam_no=1:3, S1=60:62, S2=70:72, S3=80:82, S4=90:92, S5=95:97)
merge(df1, df2, by="exam_no")

# ii.
df1 <- data.frame(exam_no=1:3, name=c("A","B","C"), class=c("TY","SY","FY"))
df2 <- data.frame(exam_no=1:3, name=c("A","B","C"), S1=60:62, S2=70:72, S3=80:82, S4=90:92, S5=95:97)
merge(df1, df2, by=c("exam_no", "name"))
```

17. cbind & rbind

```
Details <- data.frame(rollno=1:2, name=c("A","B"), class=c("TY","SY"))
Marks <- data.frame(rollno=1:2, name=c("A","B"), total_marks=c(450,480), percentage=c(90,96))
result <- cbind(Details[,1:3], Marks[,3:4])
print(result)

sales <- data.frame(empid=1:2, name=c("John","Doe"))
finance <- data.frame(empid=3:4, name=c("Anna","Mike"))
employees <- rbind(sales, finance)
print(employees)
```

18. Sorting

```
emp <- data.frame(empid=1:4, name=c("A","B","C","D"), salary=c(30000,25000,40000,35000))
```

```
emp_sorted <- emp[order(emp$salary),]
print(emp_sorted)

student <- data.frame(rollno=1:4, name=c("A","B","C","D"), division=c("A","C","B","A"),
percentage=c(70,60,85,65))
sorted_student <- student[order(student$division, -student$percentage),]
print(sorted_student)
```

19. melt & dcast

```
library(reshape2)
student <- data.frame(rollno=1:2, name=c("A","B"), S1=c(60,70), S2=c(70,80), S3=c(80,90))
student_long <- melt(student, id.vars=c("rollno", "name"))
print(student_long)
student_wide <- dcast(student_long, rollno + name ~ variable)
print(student_wide)
```

20. Data Frame Display

```
emp <- data.frame(empid=1:10, name=paste("Emp",1:10), salary=seq(20000, 50000, by=3000))
print(emp)              # i. All records
head(emp, 3)            # ii. First 3 rows
tail(emp, 3)            # iii. Last 3 rows
emp[,2]                 # iv. Only second column (name)
```