R Programming Language
Complete Study Notes (Roman Urdu)

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Contents

1 Importance of R

Definition (Roman Urdu): R ek programming language hai jo data analysis, statistics aur data visualization ke liye use hoti hai.

Detailed Explanation (Roman Urdu): R ka main kaam raw data ko samajhna aur analyze karna hota hai. Is language ki madad se hum numbers, surveys, reports aur research data ka analysis kar sakte hain. Universities mein thesis aur research ke liye R bohat zyada use hoti hai, jab ke companies R ko sales aur performance analysis ke liye use karti hain. R free aur open-source hai, is liye beginners ke liye best choice hai.

Practice Code Examples:

```
# Example 1
marks <- c(60, 70, 80)
mean(marks)
```

```
# Example 2
sum(marks)
```

```
# Example 3
max(marks)
```

```
# Example 4
min(marks)
```

```
# Example 5
summary(marks)
```

2 Data Types and Variables in R

Variable Definition (Roman Urdu): Variable ek container hota hai jisme hum data store karte hain.

Data Type Definition (Roman Urdu): Data type batata hai ke variable kis qisam ka data store kar raha hai, jaise number, text ya TRUE/FALSE.

Practice Code Examples:

```
# Example 1
age <- 20
class(age)
```

```
# Example 2
name <- "Ali"
class(name)
```

```
# Example 3
passed <- TRUE
class(passed)
```

```
# Example 4
marks <- c(55, 65, 75)
class(marks)
```

```
# Example 5
height <- 5.8
city <- "Karachi"
student <- TRUE
```

3 Operators in R

Definition (Roman Urdu): Operators wo symbols hote hain jo calculation, comparison aur logical decision ke liye use hote hain.

Practice Code Examples:

```
# Example 1
a <- 10
b <- 5
a + b
```

```
# Example 2
a - b
```

```
# Example 3
a * b
```

```
# Example 4
a > b
```

```
# Example 5
(a > 5) & (b < 10)
```

4 Conditional Statements in R

Definition (Roman Urdu): Conditional statements R ko decision lene ke qabil banati hain.

Practice Code Examples:

```r
# Example 1
marks <- 60
if (marks >= 50) {
  print("Pass")
}
```

```r
# Example 2
marks <- 40
if (marks >= 50) {
  print("Pass")
} else {
  print("Fail")
}
```

```r
# Example 3
age <- 18
if (age >= 18) {
  print("Eligible")
}
```

```r
# Example 4
temp <- 30
if (temp > 35) {
  print("Hot")
} else {
  print("Normal")
}
```

```r
# Example 5
marks <- 85
if (marks >= 80) {
  print("Grade A")
} else if (marks >= 60) {
  print("Grade B")
} else {
  print("Grade C")
}
```

5 Loops in R

Loop Definition (Roman Urdu): Loop ek aisa structure hai jo ek hi kaam ko bar bar repeat karta hai.

for Loop

for loop tab use hota hai jab humein pehle se pata ho ke loop kitni dafa chale ga.

```r
for (i in 1:5) {
  print(i)
}
```

```r
for (i in 1:3) {
  print("Learning R")
}
```

```r
marks <- c(60, 70, 80)
for (m in marks) {
  print(m)
}
```

```r
for (i in 1:4) {
  print(i^2)
}
```

```r
for (i in 1:10) {
  if (i %% 2 == 0) {
    print(i)
  }
}
```

while Loop

while loop tab use hota hai jab tak condition true rahe.

```r
i <- 1
while (i <= 5) {
  print(i)
  i <- i + 1
}
```

```
i <- 1
while (i <= 3) {
  print("R␣Language")
  i <- i + 1
}
```

```
i <- 5
while (i > 0) {
  print(i)
  i <- i - 1
}
```

```
i <- 2
while (i <= 10) {
  print(i)
  i <- i + 2
}
```

```
i <- 1
while (i <= 4) {
  print(paste("Step", i))
  i <- i + 1
}
```

repeat Loop

repeat loop infinite hota hai jab tak break use na ho.

```
i <- 1
repeat {
  print(i)
  i <- i + 1
  if (i > 5) {
    break
  }
}
```

```
i <- 1
repeat {
  print("Learning␣R")
  i <- i + 1
```

```r
  if (i == 4) {
    break
  }
}
```

```r
i <- 2
repeat {
  print(i)
  i <- i + 2
  if (i > 10) {
    break
  }
}
```

```r
i <- 5
repeat {
  print(i)
  i <- i - 1
  if (i == 0) {
    break
  }
}
```

```r
x <- 1
repeat {
  print(x)
  if (x >= 3) {
    break
  }
  x <- x + 1
}
```

break and next Statements

break: loop ko foran stop karta hai. **next:** current iteration skip karta hai.

```r
# break example
for (i in 1:5) {
  if (i == 3) {
    break
  }
  print(i)
```

```
}
```

```
# next example
for (i in 1:5) {
  if (i == 3) {
    next
  }
  print(i)
}
```

6   Conclusion

In notes mein R programming ke tamam basic concepts Roman Urdu explanation ke
sath cover kiye gaye hain. Ye notes beginners ke liye perfect hain aur lecture, exam aur
practice ke liye kaafi hain.