1. **Basic arithmetic operations in R**

```
num1 <- as.numeric(readline("Enter first number: "))
num2 <- as.numeric(readline("Enter second number: "))
cat("Addition:", num1 + num2)
cat("Subtraction:", num1 - num2)
cat("Multiplication:", num1 * num2)
cat("Division:", num1 / num2)
```

**Output**

```
Enter first number: 2
Enter second number: 3
Addition: 5Subtraction: -1Multiplication: 6Division: 0.6666667
```

2. **Check Even or Odd**

```
num <- as.integer(readline("Enter a number: "))
if (num %% 2 == 0) {
  cat(num, "is Even")
} else {
  cat(num, "is Odd")
}
```

**Output**

```
Enter a number: 4
4 is Even
```

3. **Fibonacci sequence using loop**

```
n <- as.integer(readline("Enter the number of terms: "))
a <- 0
b <- 1
cat("Fibonacci sequence:", a, b)
for (i in 3:n) {
  c <- a + b
```

```
  cat("", c)
  a <- b
  b <- c
}
```

**Output**

```
Enter the number of terms: 10
Fibonacci sequence: 0 1 1 2 3 5 8 13 21 34
```

4. **Factorial using loop**

```
n <- as.integer(readline("Enter a number: "))
fact <- 1
for (i in 1:n) {
  fact <- fact * i
}
cat("Factorial of", n, "is", fact)
```

**Output**

```
Enter a number: 5
Factorial of 5 is 120
```

5. **Create and print a vector**

```
values <- c(10, 20, 30, 40, 50)
cat("Your vector is:")
print(values)
```

**Output**

```
Your vector is:> print(values)
[1] 10 20 30 40 50
```

6. **Create and access a matrix**

```
mat <- matrix(c(1, 2, 3, 4, 5, 6), nrow = 2, ncol = 3, byrow = TRUE)
cat("Matrix:")
```

```
print(mat)
cat("Element at (2,3) =", mat[2, 3])
```

**Output**

```
> mat <- matrix(c(1, 2, 3, 4, 5, 6), nrow = 2, ncol = 3, byrow = TRUE)
> cat("Matrix:")
Matrix:> print(mat)
     [,1] [,2] [,3]
[1,]    1    2    3
[2,]    4    5    6
> cat("Element at (2,3) =", mat[2, 3])
Element at (2,3) = 6
```

**7. Data Frame and Grade Calculation**

```
names <- c("Eren", "Luffy", "Kira", "Ichigo")
marks <- c(95, 82, 67, 45)
grade <- ifelse(marks >= 90, "A",
                ifelse(marks >= 75, "B",
                       ifelse(marks >= 60, "C", "Fail")))
df <- data.frame(Name = names, Marks = marks, Grade = grade)
print(df)
```

**Output**

```
> print(df)
    Name Marks Grade
1   Eren    95     A
2  Luffy    82     B
3   Kira    67     C
4 Ichigo    45  Fail
```

**8. Survey Responses using Factor**

```
responses <- c("Yes", "No", "Yes", "Maybe", "No", "Yes")
```

```
factor_responses <- factor(responses)


print("Factor Levels:")
print(levels(factor_responses))
print("Summary:")
print(summary(factor_responses))
```

**Output**

```
> print("Factor Levels:")
[1] "Factor Levels:"
> print(levels(factor_responses))
[1] "Maybe" "No"    "Yes"
> print("Summary:")
[1] "Summary:"
> print(summary(factor_responses))
Maybe    No   Yes
   1     2     3
```

**9. Sorting and Searching in Vectors**

```
vec <- c(10, 45, 20, 5, 30)
sorted_vec <- sort(vec)
cat("Sorted vector:")
print(sorted_vec)
num <- 20
if (num %in% vec) {
  cat(num, "found in vector")
} else {
  cat(num, "not found")
}
```

**Output**

Sorted vector:> print(sorted_vec)

[1]  5 10 20 30 45

> num <- 20

> if (num %in% vec) {

+   cat(num, "found in vector")

+ } else {

+   cat(num, "not found")

+ }

20 found in vector

**10.Bar Plot of Monthly Expenses**

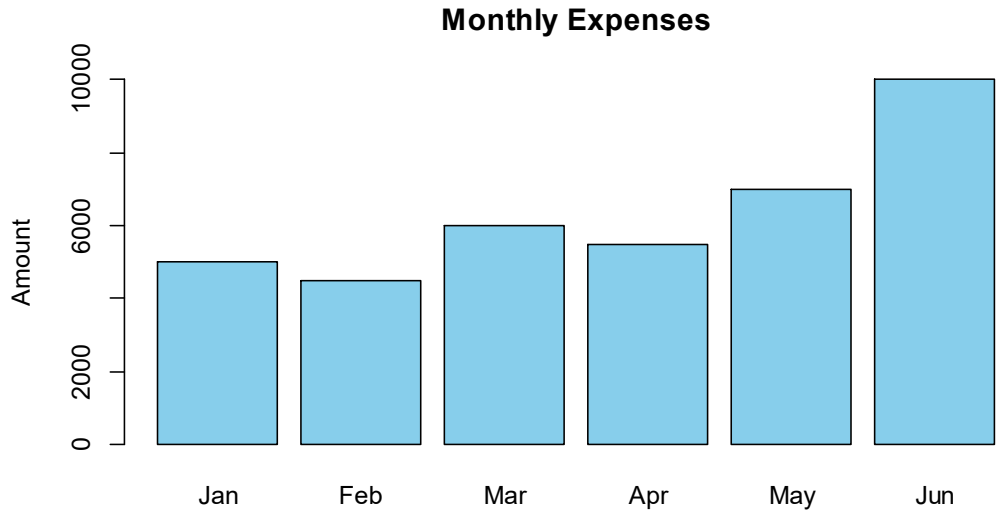
```
months <- c("Jan", "Feb", "Mar", "Apr", "May", "Jun")

expenses <- c(5000, 4500, 6000, 5500, 7000, 10000)

barplot(expenses, names.arg = months, col = "skyblue", main = "Monthly Expenses", ylab = "Amount")
```

**Output**

> months <- c("Jan", "Feb", "Mar", "Apr", "May", "Jun")

> expenses <- c(5000, 4500, 6000, 5500, 7000, 10000)

> barplot(expenses, names.arg = months, col = "skyblue", main = "Monthly Expenses", ylab = "Amount")




**11.Importing and Analyzing mtcars Dataset**

```
data("mtcars")
cat("First 6 rows of mtcars dataset:")
print(head(mtcars))
cat("Summary of dataset:")
print(summary(mtcars))
```

**Output**

```
> data("mtcars")
> cat("First 6 rows of mtcars dataset:")
First 6 rows of mtcars dataset:> print(head(mtcars))
                   mpg cyl disp  hp drat    wt  qsec vs am gear carb
Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
```

```
Valiant          18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
> cat("Summary of dataset:")
Summary of dataset:> print(summary(mtcars))
      mpg             cyl             disp             hp             drat
 Min.   :10.40   Min.   :4.000   Min.   : 71.1   Min.   : 52.0   Min.   :2.760
 1st Qu.:15.43   1st Qu.:4.000   1st Qu.:120.8   1st Qu.: 96.5   1st Qu.:3.080
 Median :19.20   Median :6.000   Median :196.3   Median :123.0   Median :3.695
 Mean   :20.09   Mean   :6.188   Mean   :230.7   Mean   :146.7   Mean   :3.597
 3rd Qu.:22.80   3rd Qu.:8.000   3rd Qu.:326.0   3rd Qu.:180.0   3rd Qu.:3.920
 Max.   :33.90   Max.   :8.000   Max.   :472.0   Max.   :335.0   Max.   :4.930
       wt             qsec             vs              am              gear
 Min.   :1.513   Min.   :14.50   Min.   :0.0000   Min.   :0.0000   Min.   :3.000
 1st Qu.:2.581   1st Qu.:16.89   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:3.000
 Median :3.325   Median :17.71   Median :0.0000   Median :0.0000   Median :4.000
 Mean   :3.217   Mean   :17.85   Mean   :0.4375   Mean   :0.4062   Mean   :3.688
 3rd Qu.:3.610   3rd Qu.:18.90   3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.:4.000
 Max.   :5.424   Max.   :22.90   Max.   :1.0000   Max.   :1.0000   Max.   :5.000
      carb
 Min.   :1.000
 1st Qu.:2.000
 Median :2.000
 Mean   :2.812
 3rd Qu.:4.000
 Max.   :8.000
```

**12.Analyzing and Visualizing mtcars Dataset**

```
data("mtcars")
cat("Mean of mpg:", mean(mtcars$mpg))
cat("Maximum horsepower:", max(mtcars$hp))
```

cat("Minimum weight:", min(mtcars$wt))

plot(mtcars$mpg, mtcars$hp, main = "MPG vs Horsepower", xlab = "Miles Per Gallon", ylab = "Horsepower", col = "blue", pch = 19)

**Output**

> data("mtcars")

> cat("Mean of mpg:", mean(mtcars$mpg))

Mean of mpg: 20.09062> cat("Maximum horsepower:", max(mtcars$hp))

Maximum horsepower: 335> cat("Minimum weight:", min(mtcars$wt))

Minimum weight: 1.513> plot(mtcars$mpg, mtcars$hp, main = "MPG vs Horsepower", xlab = "Miles Per Gallon", ylab = "Horsepower", col = "blue", pch = 19)