



## Experiment-9

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**Semester:** 6  
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**Date of Performance:**04-05-2023  
**Subject Code:** 20CST-376

### 1. Aim:

Study of Regression analysis using R programming.

### 2. Code:

```
# Generate random IQ values with mean = 30 and sd =2
IQ <- rnorm(40, 30, 2)

# Sorting IQ level in ascending order
IQ <- sort(IQ)

# Generate vector with pass and fail values of 40 students
result <- c(0, 0, 0, 1, 0, 0, 0, 0, 0, 1,
            1, 0, 0, 0, 1, 1, 0, 0, 1, 0,
            0, 0, 1, 0, 0, 1, 1, 0, 1, 1,
            1, 1, 1, 0, 1, 1, 1, 1, 0, 1)

# Data Frame
df <- as.data.frame(cbind(IQ, result))

# Print data frame
print(df)

# output to be present as PNG file
png(file="LogisticRegressionGFG.png")

# Plotting IQ on x-axis and result on y-axis
plot(IQ, result, xlab = "IQ Level",
     ylab = "Probability of Passing")

# Create a logistic model
g = glm(result~IQ, family=binomial, df)

# Create a curve based on prediction using the regression model
curve(predict(g, data.frame(IQ=x), type="resp"), add=TRUE)

# This Draws a set of points
# Based on fit to the regression model
```

```
points(IQ, fitted(g), pch=30)
```

```
# Summary of the regression model  
summary(g)
```

```
# saving the file  
dev.off()
```

### 3. Output:

```
R 4.2.2 · ~/
> # Print data frame
> print(df)
```

	IQ	result
1	23.10025	0
2	27.05939	0
3	27.29954	0
4	27.87923	1
5	28.41489	0
6	28.59236	0
7	28.62341	0
8	28.81856	0
9	28.81960	0
10	29.08283	1
11	29.27453	1
12	29.44096	0
13	29.48619	0
14	29.56063	0
15	29.75420	1
16	29.79161	1
17	29.87952	0
18	29.98405	0
19	30.25294	1
20	30.27315	0
21	30.36266	0
22	30.54369	0
23	30.83768	1
24	30.88493	0
25	30.92775	0
26	30.99528	1
27	30.99997	1
28	31.17391	0
29	31.22656	1
30	31.47640	1
31	31.49490	1
32	31.67155	1
33	31.74722	1

```
# Summary of the regression model
> summary(g)

Call:
glm(formula = result ~ IQ, family = binomial, data = df)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-1.9431  -0.9614  -0.3063   0.9462   1.9019

Coefficients:
              Estimate Std. Error z value Pr(>|z|)
(Intercept) -18.9955     7.7938  -2.437   0.0148
IQ           0.6229     0.2559   2.434   0.0149

(Intercept) *
IQ           *
---
Signif. codes:
  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 55.352  on 39  degrees of freedom
Residual deviance: 46.957  on 38  degrees of freedom
AIC: 50.957

Number of Fisher Scoring iterations: 4
```

