1. **Set working directory**

setwd("E:/Statisrical progamming")

1. **Install Libraries**

install.packages("ggplot2")

install. packages("dplyr")

install.packages("scales")

1. **Import libraries**

library(ggplot2)

library(scales)

library(dplyr)

1. **Descriptive summary of age**

summary(bank$age)

1. **Histrogram for age**

ggplot(bank,

aes(x = age,

y= ..count.. / sum(..count..))) +

geom\_histogram(fill = "cornflowerblue",

color = "white") +

labs(title="Participants by age",

y = "Percent",

x = "Age") +

scale\_y\_continuous(labels = percent)

1. **Density Graph for age**

ggplot(bank, aes(x = age)) +

geom\_density(fill = "indianred3", bw = 8) +

labs(title = "Participants by age")

1. **Descriptive summary for duration**

summary(bank$duration)

1. **Histrogram for duration**

ggplot(bank,

aes(x =duration,

y= ..count.. / sum(..count..))) +

geom\_histogram(fill = "cornflowerblue",

color = "white") +

labs(title="last contact duration, in seconds",

y = "Percent",

x = "Duration") +

scale\_y\_continuous(labels = percent)

1. **Density graph for Duration**

ggplot(bank, aes(x = duration)) +

geom\_density(fill = "indianred3", bw = 25) +

labs(title = "last contact duration, in seconds")

1. **Density graph for duration**

ggplot(bank, aes(x = duration)) +

geom\_density(fill = "indianred3", bw = 25) +

labs(title = "last contact duration, in seconds")

1. **Bargraph for Type of job**

plotdata <- bank %>%

count(job) %>%

mutate(pct = n / sum(n),

pctlabel = paste0(round(pct\*100), "%"))

ggplot(plotdata,

aes(x = reorder(job, -pct),

y = pct)) +

geom\_bar(stat = "identity",

fill = "indianred3",

color = "black") +

geom\_text(aes(label = pctlabel),

vjust = -0.25) +

scale\_y\_continuous(labels = percent) +

labs(x = "job ",

y = "Percent",

title = "Type of job")+theme(axis.text.x = element\_text(angle = 45,

hjust = 1))

1. **Bargraph for marital status**

plotdata <- bank %>%

count(marital) %>%

mutate(pct = n / sum(n),

pctlabel = paste0(round(pct\*100), "%"))

ggplot(plotdata,

aes(x = reorder(marital, -pct),

y = pct)) +

geom\_bar(stat = "identity",

fill = "indianred3",

color = "black") +

geom\_text(aes(label = pctlabel),

vjust = -0.25) +

scale\_y\_continuous(labels = percent) +

labs(x = "marital ",

y = "Percent",

title = "marital status")+theme(axis.text.x = element\_text(angle = 45,

hjust = 1))

1. **Bargraph for education**

plotdata <- bank %>%

count(marital) %>%

mutate(pct = n / sum(n),

pctlabel = paste0(round(pct\*100), "%"))

ggplot(plotdata,

aes(x = reorder(marital, -pct),

y = pct)) +

geom\_bar(stat = "identity",

fill = "indianred3",

color = "black") +

geom\_text(aes(label = pctlabel),

vjust = -0.25) +

scale\_y\_continuous(labels = percent) +

labs(x = "marital ",

y = "Percent",

title = "marital status")+theme(axis.text.x = element\_text(angle = 45,

hjust = 1))

1. **Bargraph Credit in default**

plotdata <- bank %>%

count(default) %>%

mutate(pct = n / sum(n),

pctlabel = paste0(round(pct\*100), "%"))

ggplot(plotdata,

aes(x = reorder(default, -pct),

y = pct)) +

geom\_bar(stat = "identity",

fill = "indianred3",

color = "black") +

geom\_text(aes(label = pctlabel),

vjust = -0.25) +

scale\_y\_continuous(labels = percent) +

labs(x = "default ",

y = "Percent",

title = "has credit in default")+theme(axis.text.x = element\_text(angle = 45,

hjust = 1))

1. **Bargraph housing loan**

plotdata <- bank %>%

count(housing) %>%

mutate(pct = n / sum(n),

pctlabel = paste0(round(pct\*100), "%"))

ggplot(plotdata,

aes(x = reorder(housing, -pct),

y = pct)) +

geom\_bar(stat = "identity",

fill = "indianred3",

color = "black") +

geom\_text(aes(label = pctlabel),

vjust = -0.25) +

scale\_y\_continuous(labels = percent) +

labs(x = "housing",

y = "Percent",

title = "Housing loan")+theme(axis.text.x = element\_text(angle = 45,

hjust = 1))

1. **Bargraph for contact communication type**

plotdata <- bank %>%

count(contact) %>%

mutate(pct = n / sum(n),

pctlabel = paste0(round(pct\*100), "%"))

ggplot(plotdata,

aes(x = reorder(contact, -pct),

y = pct)) +

geom\_bar(stat = "identity",

fill = "indianred3",

color = "black") +

geom\_text(aes(label = pctlabel),

vjust = -0.25) +

scale\_y\_continuous(labels = percent) +

labs(x = "contact",

y = "Percent",

title = "communication contact type")+theme(axis.text.x = element\_text(angle = 45,

hjust = 1))

1. **Bargraph for Last contact month of year**

plotdata <- bank %>%

count(month) %>%

mutate(pct = n / sum(n),

pctlabel = paste0(round(pct\*100), "%"))

ggplot(plotdata,

aes(x = reorder(month, -pct),

y = pct)) +

geom\_bar(stat = "identity",

fill = "indianred3",

color = "black") +

geom\_text(aes(label = pctlabel),

vjust = -0.25) +

scale\_y\_continuous(labels = percent) +

labs(x = "month",

y = "Percent",

title = "last contact month of year")+theme(axis.text.x = element\_text(angle = 45,

hjust = 1))

1. **Stack bar chart for credit in default by marital**

plotdata <- bank%>%

group\_by(marital,default) %>%

summarize(n = n()) %>%

mutate(pct = n/sum(n),

lbl = scales::percent(pct))

ggplot(plotdata,

aes(x = factor(marital),y = pct,

fill = factor(default)))+ geom\_bar(stat = "identity",

position = "fill") +

scale\_y\_continuous(breaks = seq(0, 1, .2),

label = percent) +

geom\_text(aes(label = lbl),

size = 3,

position = position\_stack(vjust = 0.5)) +

scale\_fill\_brewer(palette = "Set2") +

labs(y = "Percent",

fill = "default",

x = "marital",

title = "Has credit in default by marital") +

theme\_minimal()

1. **Stack bar chart housing by marital**

plotdata <- bank%>%

group\_by(marital,housing) %>%

summarize(n = n()) %>%

mutate(pct = n/sum(n),

lbl = scales::percent(pct))

ggplot(plotdata,

aes(x = factor(marital),y = pct,

fill = factor(housing)))+ geom\_bar(stat = "identity",

position = "fill") +

scale\_y\_continuous(breaks = seq(0, 1, .2),

label = percent) +

geom\_text(aes(label = lbl),

size = 3,

position = position\_stack(vjust = 0.5)) +

scale\_fill\_brewer(palette = "Set2") +

labs(y = "Percent",

fill = "housing",

x = "marital",

title = "Housing Loan by marital") +

theme\_minimal()

1. **Boxplot for Duration vs age**

ggplot(bank,

aes(x = age,

y = duration)) +

geom\_point(color= "steelblue") +

geom\_smooth(method = "lm")+labs(title = "duration vs age")

1. **Boxplot for Duration by marital**

ggplot(bank,

aes(x = marital,

y = duration)) +

geom\_boxplot(fill = "indianred3",

color = "black") + labs(title = "duration by marital")

21.Boxplot Duration by type of job

ggplot(bank,

aes(x = job,

y = duration)) +

geom\_boxplot(fill = "indianred3",

color = "black") + labs(title = "job by marital")