

Bivariate_Data_with_Different_Correlations

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```
library(MASS)
library(gridExtra)
```

```
## Warning: package 'gridExtra' was built under R version 4.2.3
```

```
library(ggplot2)
```

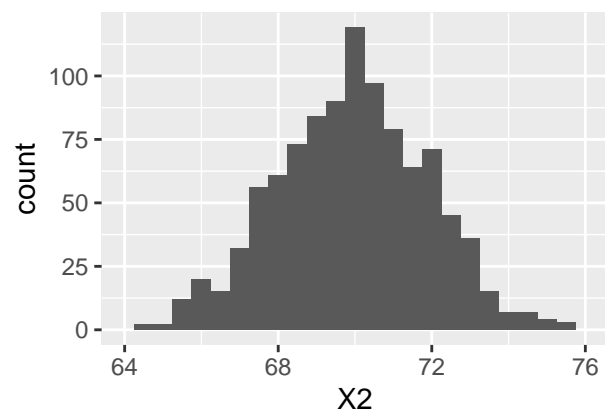
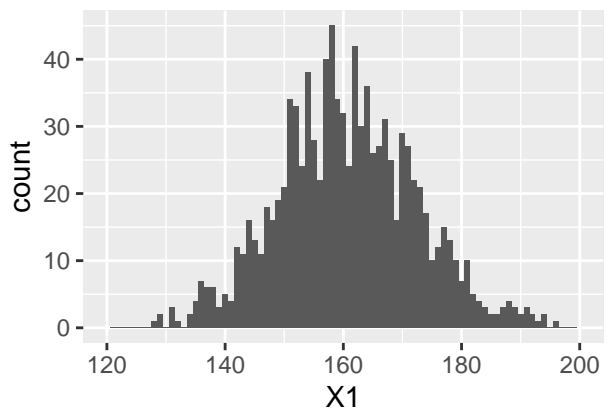
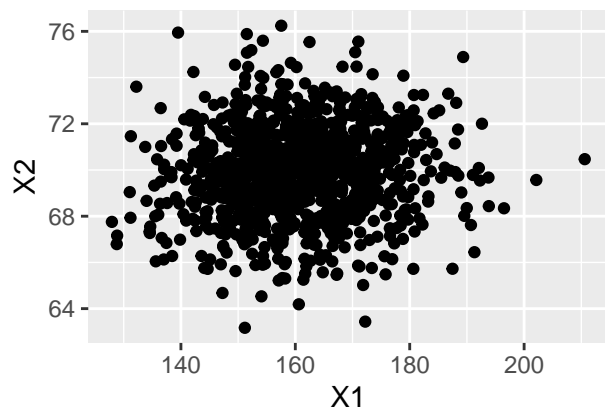
```
sig <- matrix(c(144,0,0,4),2,2)
bv.data.1 <- mvrnorm(n=1000, mu=c(160,70), Sigma = sig)
colnames(bv.data.1) <- c('X1','X2')
p1 <- ggplot(as.data.frame(bv.data.1),aes(x=X1, y=X2)) + geom_point()
p1.h.x1 <- ggplot(as.data.frame(bv.data.1), aes(x=X1)) + geom_histogram(binwidth = 1) + xlim(120,200)
p1.h.x2 <- ggplot(as.data.frame(bv.data.1), aes(x=X2)) + geom_histogram(binwidth = 0.5) + xlim(64,76)
grid.arrange(p1,p1.h.x1, p1.h.x2, nrow(1))
```

```
## Warning: Removed 2 rows containing non-finite values ('stat_bin()').
```

```
## Warning: Removed 2 rows containing missing values ('geom_bar()').
```

```
## Warning: Removed 3 rows containing non-finite values ('stat_bin()').
```

```
## Warning: Removed 2 rows containing missing values ('geom_bar()').
```

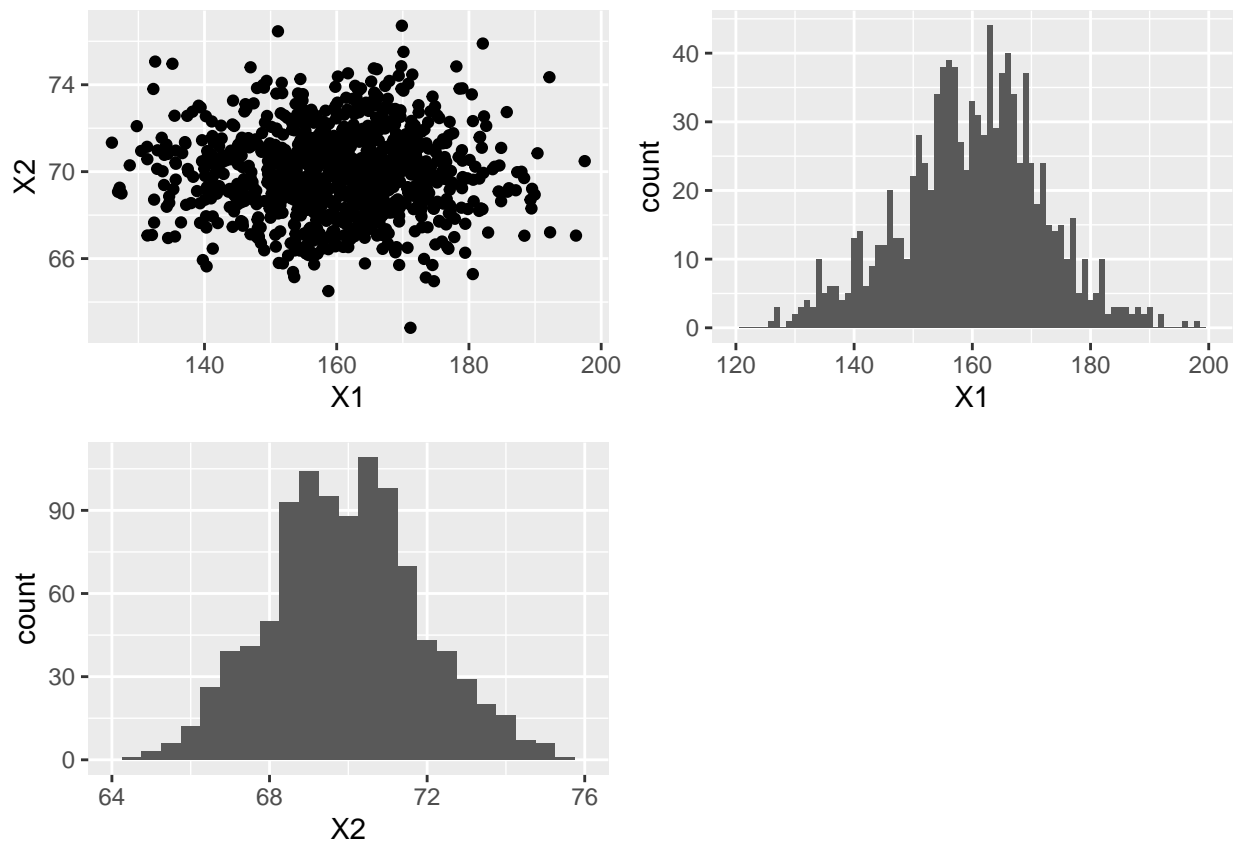


```
sig <- matrix(c(144,1,1,4),2,2)
bv.data.2 <- mvrnorm(n=1000, mu=c(160,70), Sigma = sig)
colnames(bv.data.2) <- c('X1','X2')
p1 <- ggplot(as.data.frame(bv.data.2),aes(x=X1, y=X2)) + geom_point()
p1.h.x1 <- ggplot(as.data.frame(bv.data.2), aes(x=X1)) + geom_histogram(binwidth = 1) + xlim(120,200)
p1.h.x2 <- ggplot(as.data.frame(bv.data.2), aes(x=X2)) + geom_histogram(binwidth = 0.5) + xlim(64,76)
grid.arrange(p1,p1.h.x1, p1.h.x2, nrow(1))
```

```
## Warning: Removed 2 rows containing missing values ('geom_bar()').
```

```
## Warning: Removed 3 rows containing non-finite values ('stat_bin()').
```

```
## Warning: Removed 2 rows containing missing values ('geom_bar()').
```



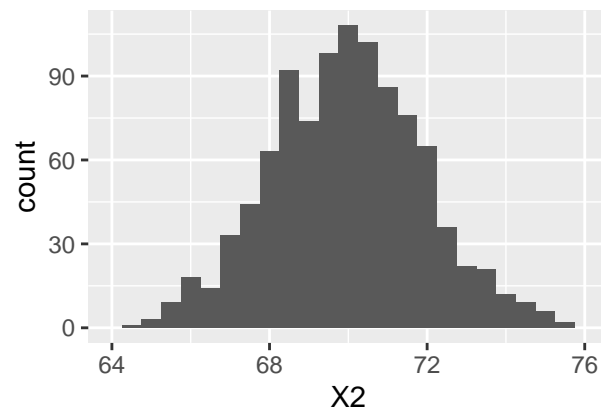
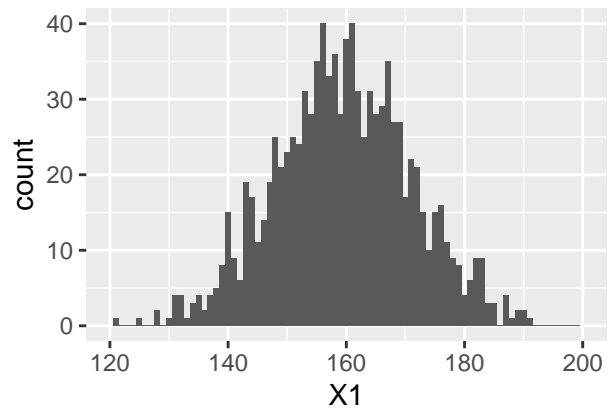
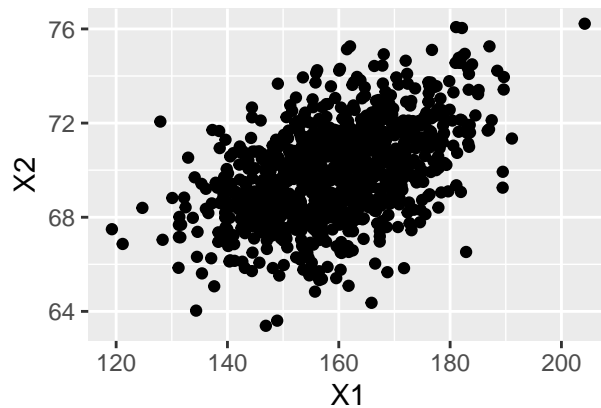
```
sig <- matrix(c(144,12,12,4),2,2)
bv.data.3 <- mvrnorm(n=1000, mu=c(160,70), Sigma = sig)
colnames(bv.data.3) <- c('X1', 'X2')
p1 <- ggplot(as.data.frame(bv.data.3), aes(x=X1, y=X2)) + geom_point()
p1.h.x1 <- ggplot(as.data.frame(bv.data.3), aes(x=X1)) + geom_histogram(binwidth = 1) + xlim(120,200)
p1.h.x2 <- ggplot(as.data.frame(bv.data.3), aes(x=X2)) + geom_histogram(binwidth = 0.5) + xlim(64,76)
grid.arrange(p1,p1.h.x1, p1.h.x2, nrow(1))
```

```
## Warning: Removed 2 rows containing non-finite values ('stat_bin()').
```

```
## Warning: Removed 2 rows containing missing values ('geom_bar()').
```

```
## Warning: Removed 5 rows containing non-finite values ('stat_bin()').
```

```
## Warning: Removed 2 rows containing missing values ('geom_bar()').
```



```
sig <- matrix(c(144,20,20,4),2,2)
bv.data.4 <- mvrnorm(n=1000, mu=c(160,70), Sigma = sig)
colnames(bv.data.4) <- c('X1', 'X2')
p1 <- ggplot(as.data.frame(bv.data.4), aes(x=X1, y=X2)) + geom_point()
p1.h.x1 <- ggplot(as.data.frame(bv.data.4), aes(x=X1)) + geom_histogram(binwidth = 1) + xlim(120,200)
p1.h.x2 <- ggplot(as.data.frame(bv.data.4), aes(x=X2)) + geom_histogram(binwidth = 0.5) + xlim(64,76)
grid.arrange(p1,p1.h.x1, p1.h.x2, nrow(1))
```

```
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```

```
## Warning: Removed 2 rows containing missing values ('geom_bar()').
```

```
## Warning: Removed 3 rows containing non-finite values ('stat_bin()').
```

```
## Warning: Removed 2 rows containing missing values ('geom_bar()').
```

