Intro to R Programming: Class Test - Solutions

Task 1

1.

```
cats <- read.csv("cats.csv")
```

2.

```
cats.male <- subset(cats,Sex == "M")
cats.female <- subset(cats,Sex == "F")
nrow(cats.male)
```

```
## [1] 96
```

```
nrow(cats.female)
```

```
## [1] 47
```

3.

```
mean(subset(cats,Sex=="M" & Bwt >3)$Hwt)
```

```
## [1] 13.53143
```

4.

```
cats[which.max(cats$Bwt),]
```

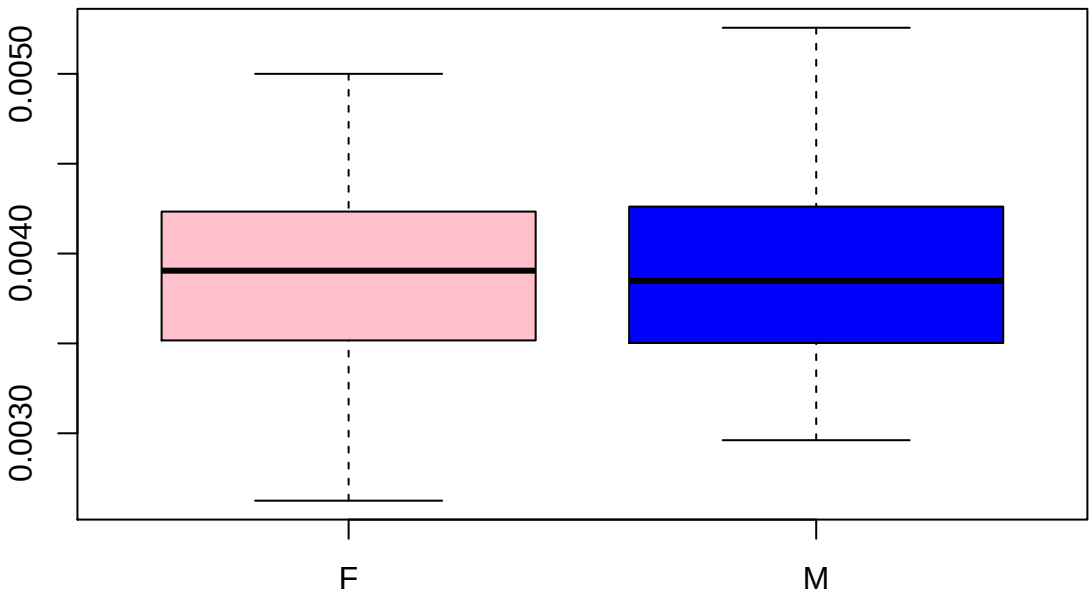
```
##     Sex Bwt  Hwt
## 142   M 3.9 14.4
```

5.

```
cats <- transform(cats, Hearth.percent = Hwt/(Bwt*1000))
```

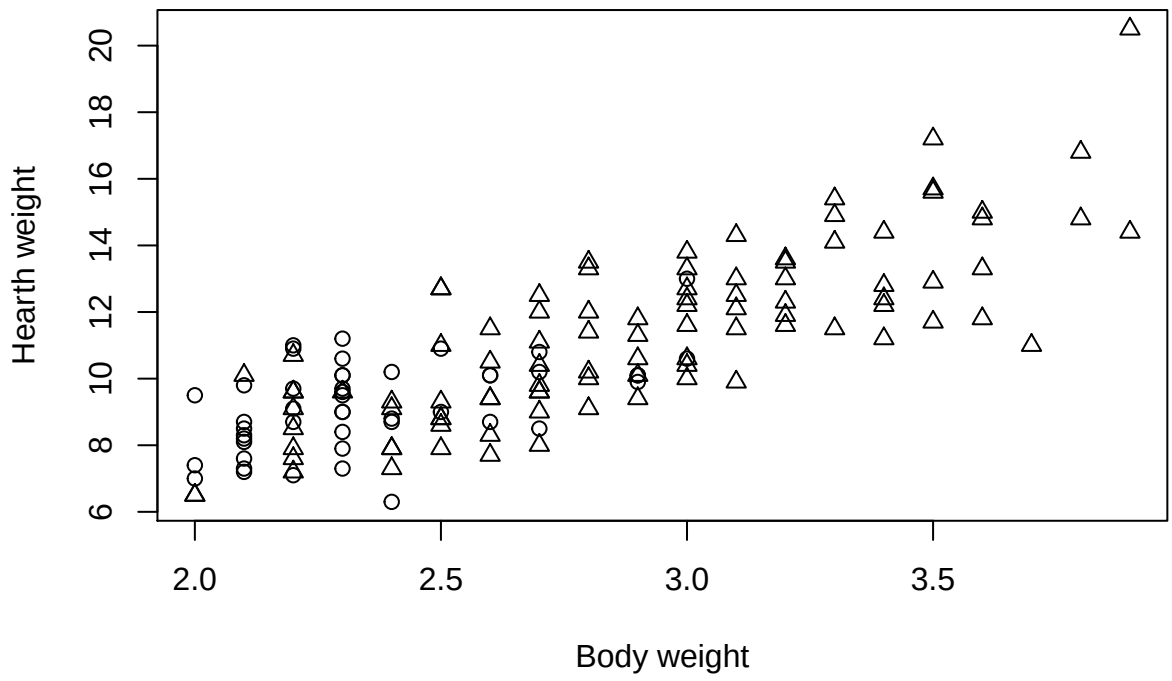
6.

```
boxplot(cats$Hearth.percent~cats$Sex,col=c("pink","blue"))
```



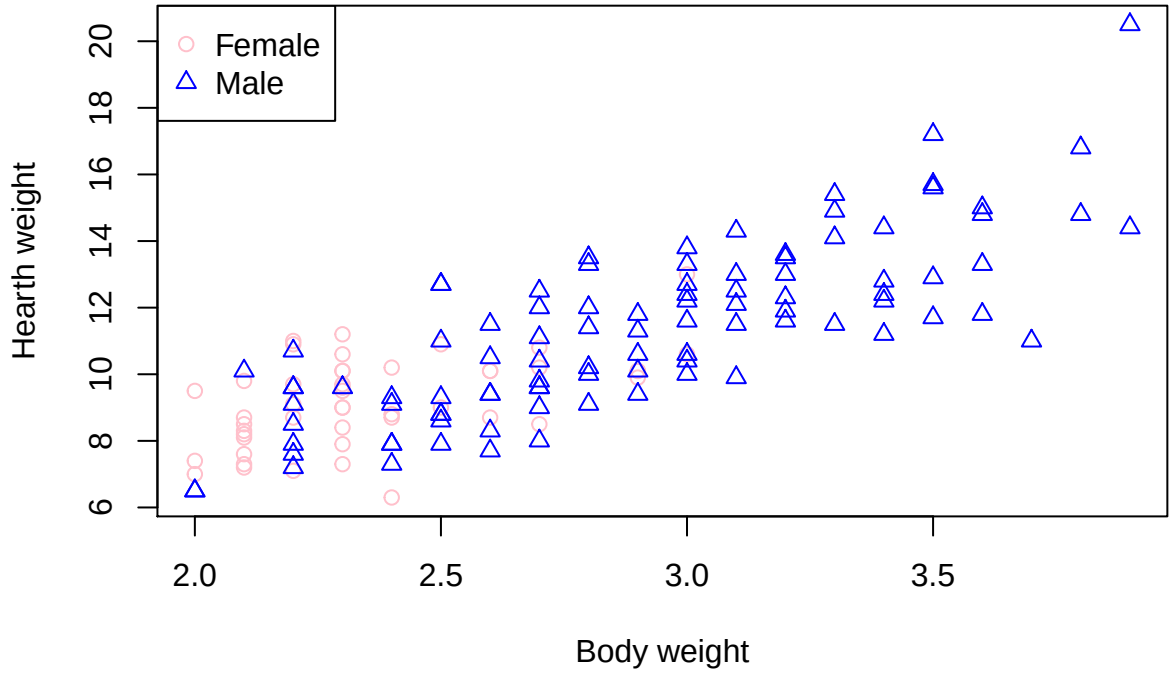
7.

```
plot(cats$Hwt~cats$Bwt,pch=unclass(cats$Sex),
     xlab="Body weight", ylab="Hearth weight")
```



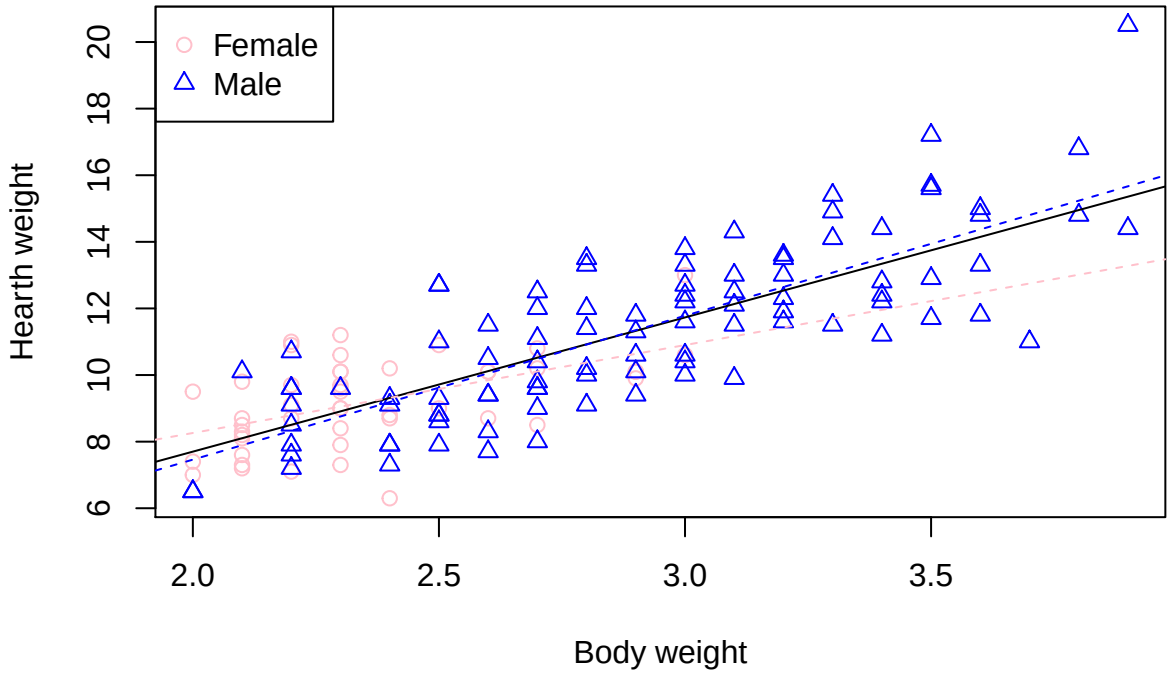
8.

```
mycols <- c("pink","blue")
plot(cats$Hwt~cats$Bwt,pch=unclass(cats$Sex),xlab="Body weight",
     ylab="Hearth weight",col=mycols[unclass(cats$Sex)])
legend("topleft",pch=1:2,col=c("pink","blue"),legend=c("Female","Male"))
```



9. (and 10)

```
mycols <- c("pink","blue")
plot(cats$Hwt~cats$Bwt,pch=unclass(cats$Sex),xlab="Body weight",
     ylab="Hearth weight",col=mycols[unclass(cats$Sex)])
legend("topleft",pch=1:2,col=c("pink","blue"),legend=c("Female","Male"))
abline(-0.36,4.03)
abline(-1.18,4.32,col="blue",lty=2)
abline(2.98,2.64,col="pink",lty=2)
```



11.

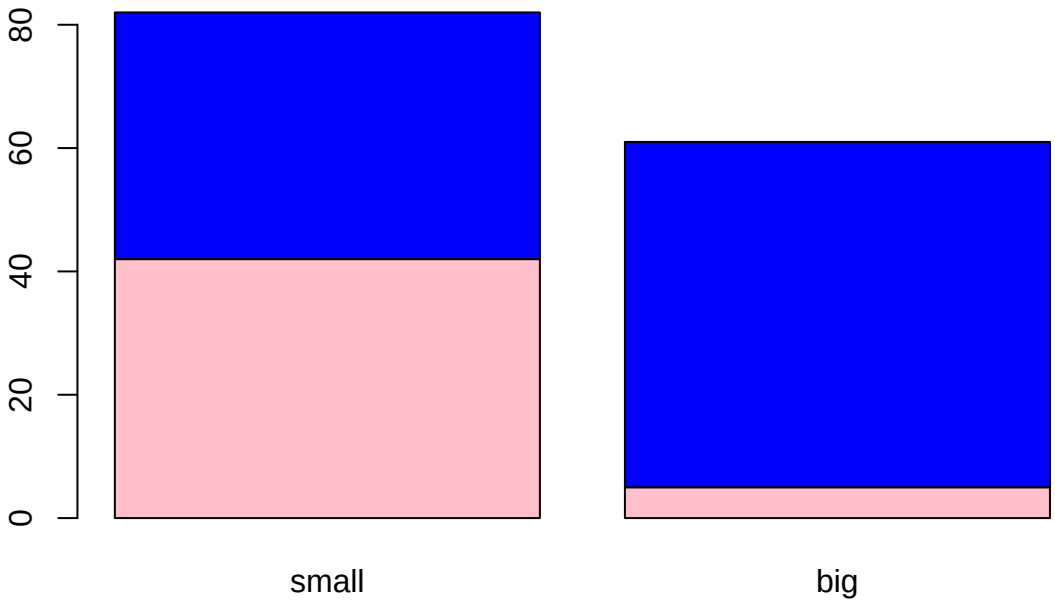
```
med <- sort(cats$Bwt)[0.5*nrow(cats)]
```

12.

```
Btw.discrete <- cut(cats$Bwt,breaks=c(0,med,Inf),labels = c("small","big"))
```

13.

```
barplot(table(cats$Sex,Btw.discrete),col=c("pink","blue"))
```



Task 2

1.

```
A <- cbind(c(1,0,0,3),c(0,4,2,0),c(0,2,17,8),c(3,0,8,49))
A
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    0    0    3
## [2,]    0    4    2    0
## [3,]    0    2   17    8
## [4,]    3    0    8   49
```

2.

```
b <- c(1:2,4:5)
b
```

```
## [1] 1 2 4 5
```

3.

```
solve(A,b)
```

```
## [1] 0.95833333 0.40972222 0.18055556 0.01388889
```

4 .

```
eig <- eigen(A)
round(eig$vectors%*%diag(eig$values)%*%solve(eig$vectors))
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    0    0    3
## [2,]    0    4    2    0
## [3,]    0    2   17    8
## [4,]    3    0    8   49
```

Task 3

```r
arrival <- as.data.frame(cbind(runif(10000,0,120),runif(10000,0,120)))
arrival$meet <- abs(arrival[,1]-arrival[,2])<= 20
sum(arrival$meet)/nrow(arrival)
```

```
## [1] 0.3029
```