

1) a) Gender : Female , Height (in cm) : 157

b) Gender of elder : NA , Height (in cm) of elder : NA

2. a) Parent's Gender : Male , Parent's Height : 176 cm

Parent's Oldest sibling ~~is~~ gender : Male , Height : 180 cm .

# Homework11

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```
set.seed(51)
```

```
#Solution 3
```

```
z = rnorm(1000,mean=0,sd=1) #Taking 1000 samples of Normal(0,1)
```

```
#Solution 3.a
```

```
zcinf = function(v){ #function to calculate Confidence interval for known sd  
  n = length(v)  
  Z= qnorm(0.95/2,lower.tail=FALSE)  
  c(mean(v)-Z*1.5/sqrt(n),mean(v)+Z*1.5/sqrt(n))  
}  
zcinf(z)
```

```
## [1] 0.01481114 0.02076003
```

```
#Solution 3.b
```

```
#1-alpha = 0.95
```

```
tcinf = function(v){ #function to calculate Confidence interval for unknown sd  
  n = length(v)  
  Z = qnorm(0.95/2,lower.tail=FALSE)  
  c(mean(v)-Z*sd(v)/sqrt(n),mean(v)+Z*sd(v)/sqrt(n))  
}  
tcinf(z)
```

```
## [1] 0.01580658 0.01976459
```

```
#Solution 5
```

```
data = c(94.0, 98.6, 96.8, 95.5, 93.8, 95.6, 99.3, 95.8, 93.9, 90.2, 91.0, 93.9)  
ci = tcinf(data) #Calculates the Confidence interval for the given Noise data  
ci_round =c()  
for (i in ci){  
  ci_round=c(ci_round,round(i,1))  
}  
ci_round
```

```
## [1] 94.8 94.9
```

*#The expected noise level will lie in the range (94.8, 94.9) with 95% Confidence.*

*#Solution 6*

```
attach(iris)
head(iris)
```

```
## Sepal.Length Sepal.Width Petal.Length Petal.Width Species
## 1          5.1          3.5          1.4          0.2 setosa
## 2          4.9          3.0          1.4          0.2 setosa
## 3          4.7          3.2          1.3          0.2 setosa
## 4          4.6          3.1          1.5          0.2 setosa
## 5          5.0          3.6          1.4          0.2 setosa
## 6          5.4          3.9          1.7          0.4 setosa
```

*#Confidence interval for sepal length of each species*

*#We extract the sepal length data corresponding to each species and then  
#apply the function tcinf constructed in Solution 3 to find the 95%  
#confidence interval for each of them.*

```
set_sep_1 = iris[iris$Species=='setosa',]$Sepal.Length
print(paste('The confidence Interval for Sepal.Length of Setosa is: (',tcinf(set_sep_1)[1],tcinf(set_sep_1)[2],')'))
```

```
## [1] "The confidence Interval for Sepal.Length of Setosa is: ( 5.00287409410694 5.00912590589306 )"
```

```
vers_sep_1 = iris[iris$Species=='versicolor',]$Sepal.Length
print(paste('The confidence Interval for Sepal.Length of versicolor is: (',tcinf(vers_sep_1)[1],tcinf(vers_sep_1)[2],')'))
```

```
## [1] "The confidence Interval for Sepal.Length of versicolor is: ( 5.93142255422225 5.94057744577775 )"
```

```
virg_sep_1 = iris[iris$Species=='virginica',]$Sepal.Length
print(paste('The confidence Interval for Sepal.Length of virginica is: (',tcinf(virg_sep_1)[1],tcinf(virg_sep_1)[2],')'))
```

```
## [1] "The confidence Interval for Sepal.Length of virginica is: ( 6.58236097043403 6.59363902956597 )"
```

*#Confidence interval for sepal width of each species*

*#We extract the sepal width data corresponding to each species and then*

*#apply the function tcinf constructed in Solution 3 to find the 95%*

*#confidence interval for each of them.*

```
set_sep_w = iris[iris$Species=='setosa',]$Sepal.Width
```

```
print(paste('The confidence Interval for Sepal.Width of Setosa is: (',tcinf(set_sep_w)[1],tcinf(set_sep_w)[2],')'))
```

```
## [1] "The confidence Interval for Sepal.Width of Setosa is: ( 3.42463842776628 3.43136157223372 )"
```

```
vers_sep_w = iris[iris$Species=='versicolor',]$Sepal.Width
```

```
print(paste('The confidence Interval for Sepal.Width of versicolor is: (',tcinf(vers_sep_w)[1],tcinf(vers_sep_w)[2],')'))
```

```
## [1] "The confidence Interval for Sepal.Width of versicolor is: ( 2.76721721212318 2.77278278787682 )"
```

```
virg_sep_w = iris[iris$Species=='virginica',]$Sepal.Width
```

```
print(paste('The confidence Interval for Sepal.Width of virginica is: (',tcinf(virg_sep_w)[1],tcinf(virg_sep_w)[2],')'))
```

```
## [1] "The confidence Interval for Sepal.Width of virginica is: ( 2.97114007479275 2.97685992520725 )"
```

*#Confidence interval for petal width of each species*

*#We extract the petal length data corresponding to each species and then*

*#apply the function tcinf constructed in Solution 3 to find the 95%*

*#confidence interval for each of them.*

```
set_pet_l = iris[iris$Species=='setosa',]$Petal.Length
```

```
print(paste('The confidence Interval for Petal.Length of Setosa is: (',tcinf(set_pet_l)[1],tcinf(set_pet_l)[2],')'))
```

```
## [1] "The confidence Interval for Petal.Length of Setosa is: ( 1.46045993420601 1.46354006579399 )"
```

```
vers_pet_l = iris[iris$Species=='versicolor',]$Petal.Length
```

```
print(paste('The confidence Interval for Petal.Length of versicolor is: (',tcinf(vers_pet_l)[1],tcinf(vers_pet_l)[2],')'))
```

```
## [1] "The confidence Interval for Petal.Length of versicolor is: ( 4.2558327929972 4.2641672070028 )"
```

```
virg_pet_l = iris[iris$Species=='virginica',]$Petal.Length
```

```
print(paste('The confidence Interval for Petal.Length of virginica is: (',tcinf(virg_pet_l)[1],tcinf(virg_pet_l)[2],')'))
```

```
## [1] "The confidence Interval for Petal.Length of virginica is: ( 5.54710575502176 5.556894
24497824 )"
```

```
#Confidence interval for petal width of each species
```

```
#We extract the petal width data corresponding to each species and then
```

```
#apply the function tcinf constructed in Solution 3 to find the 95%
```

```
#confidence interval for each of them.
```

```
set_pet_w = iris[iris$Species=='setosa',]$Petal.Width
```

```
print(paste('The confidence Interval for Petal.Width of Setosa is: (',tcinf(set_pet_w)[1],tci
nf(set_pet_w)[2],')'))
```

```
## [1] "The confidence Interval for Petal.Width of Setosa is: ( 0.245065432417353 0.246934567
582647 )"
```

```
vers_pet_w = iris[iris$Species=='versicolor',]$Petal.Width
```

```
print(paste('The confidence Interval for Petal.Width of versicolor is: (',tcinf(vers_pet_w)[1
],tcinf(vers_pet_w)[2],')'))
```

```
## [1] "The confidence Interval for Petal.Width of versicolor is: ( 1.32424631389167 1.327753
68610833 )"
```

```
virg_pet_w = iris[iris$Species=='virginica',]$Petal.Width
```

```
print(paste('The confidence Interval for Petal.Width of virginica is: (',tcinf(virg_pet_w)[1
],tcinf(virg_pet_w)[2],')'))
```

```
## Warning in mean.default(v): argument is not numeric or logical: returning NA
```

```
## Warning in mean.default(v): argument is not numeric or logical: returning NA
```

```
## Warning in mean.default(v): argument is not numeric or logical: returning NA
```

```
## Warning in mean.default(v): argument is not numeric or logical: returning NA
```

```
## [1] "The confidence Interval for Petal.Width of virginica is: ( NA NA )"
```