Question 2

- A random variable, X is uniform, which os often graphically depicted as a box from 0 to 1 with a height 1.
  (Such that it's density is $f(x) = 1$ for $0 \leq x \leq 1$.)
- What is it's 75th percentile?
- Express your answer to two decimal places.

Using R

```
# Generate 100 realizations of
# the random variable X.
X<-runif(100)

X<-round(X,3)

sort(X)
```

Statistical Inference : Question 2

```
> sort(X)
  [1] 0.016 0.018 0.040 0.087 0.096 0.101
  [7] 0.110 0.137 0.146 0.149 0.149 0.157
  ..........................................
  ..........................................
 [61] 0.666 0.667 0.669 0.674 0.680 0.680
 [67] 0.686 0.715 0.721 0.726 0.733 0.756
 [73] 0.759 0.759 0.764 0.780 0.782 0.786
 [79] 0.801 0.835 0.846 0.850 0.850 0.858
 [85] 0.862 0.866 0.884 0.893 0.895 0.905
 [91] 0.914 0.916 0.918 0.921 0.922 0.926
 [97] 0.934 0.955 0.963 0.970
```

Statistical Inference : Question 2

```
X <-runif(50000)

quantile(X,0.75)
```

Question 4

- You are playing a game with a friend where you flip a coin and if it comes up heads you give her 1 dollar and if it comes up tails she gives you one dollar.
- What would be the variance of your earnings?
- Express your answer to two decimal places.

Statistical Inference : Question 4

- Probability of winning a round $p = 0.5$
- Probability of losing a round $q = -p = 0.5$

R Code

```
#Generate a sequence of 1s or -1s
X <- runif(40)
Winnings <- sign(X-0.5)

# > Winnings
# [1]   1   1 -1 -1 -1 -1   1   1
# [9]  -1 -1 -1 -1   1 -1   1 -1
# [17]  1   1   1   1 -1   1   1 -1
# [25]  1   1   1   1 -1 -1 -1   1
# [33] -1 -1 -1 -1 -1   1   1   1
```

R Code

```
var(Winnings)
```