

## Question 2

- A random variable,  $X$  is uniform, which is 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  $q = 1 - p = 0.5$

```
#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
```

```
var(Winnings)
```