STAT 35000
Introduction to Statistics

Project # 3

Task 1:

a) User define probability mass function. Suppose you have a random variable that can take the integer values 1,…10.

```
XX <- 1:10
```

b) Assign the pmf p(x)=Pr(X=x) as: p(1)=0.01, p(2)=1.2….

```
PP <- c(.01,.12,.13,.14,.2,.2,.1,.05,.04,.01)
```

c) Check that this p(x) sums to one

```
sum(PP)
```

d) The following puts two graphs one on top of the other

```
require(graphics)
par(mfrow = c(2,  1))
```

e) Now plot the pmf you defined above (the specified option "h" means that the plot is vertical lines

```
plot(XX,PP,type="h",col=2,main="Pmf list",xlab="x",ylab="p(x)")
points(XX,PP,col=2);abline(h=0,col=3)
```

f) Obtain the cumulative probability distribution function (cdf)

.

```
QQ <- cumsum(PP)
```

g) Print all these values together

```
c(XX, PP, QQ)
```

h) Now plot the cdf, the option "s" means that the plot should be a staircase type. The c(0, XX) and c(0, QQ) adds a zero starting point.

```
plot(c(1,XX),c(0,QQ),type="s",   ylab="F(x)",col=2,xlab="x",
   main="Cdf for user defined    dist.")
abline(h=0:1,col=4)
```

Task 2:

Use the above approach to calculate and plot the pmf and the cdf for the first 11 values (x=0, 1, 2, …10) of the:

a) Binomial distribution with n=10 and p=0.6

- `pbinom(XX, size =10,prob =0.6) # note that n stands for 'size'`
- `dbinom(XX, size =10,prob =0.6) # note that n stands for 'size'`

b) and of the Poisson distribution with lambda=6 (corresponding to `n=10 and p=0.6`)

- `ppois(XX, lambda = 6)`
- `dpios(XX, lambda = 6)`