Discrete Probability Distributions

Guidelines for R

General Cases

Less than or equal to

The probability that X is **less than or equal** to a: $Pr(X \leq a)$:

$$function(a,\ ...)$$

Example

- $Pr(X \leq 5)$, assume $X \sim Binomial(n = 10,\ p = 0.6)$

```
pbinom(5, size = 10, prob = 0.6)
```

```
## [1] 0.3668967
```

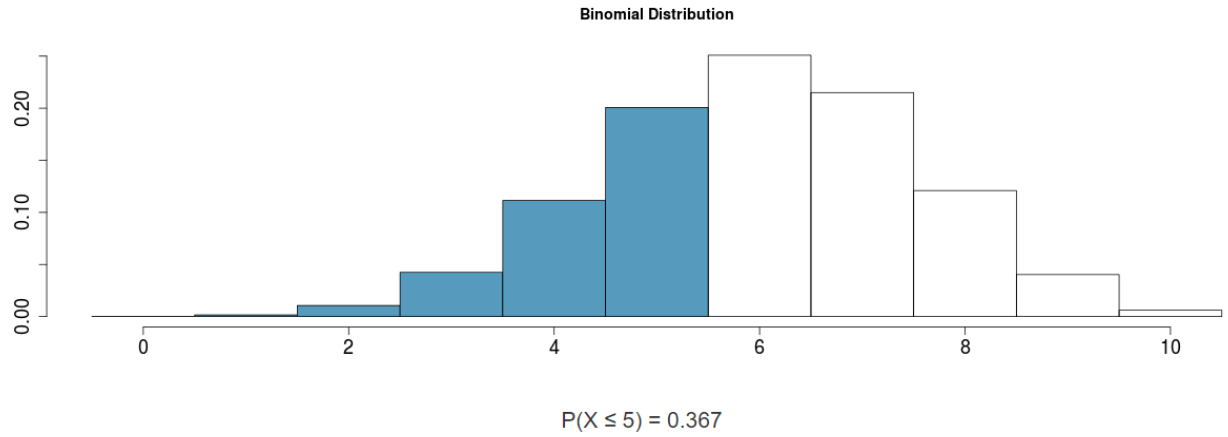

Figure 1:

Less than

The probability that X is **less than** a: $Pr(X < a)$:

$$function(a - 1,\ ...)$$

Example

- $Pr(X < 5)$, assume $X \sim Binomial(n = 10,\ p = 0.6)$

```
pbinom(4, size = 10, prob = 0.6)
```

```
## [1] 0.1662386
```

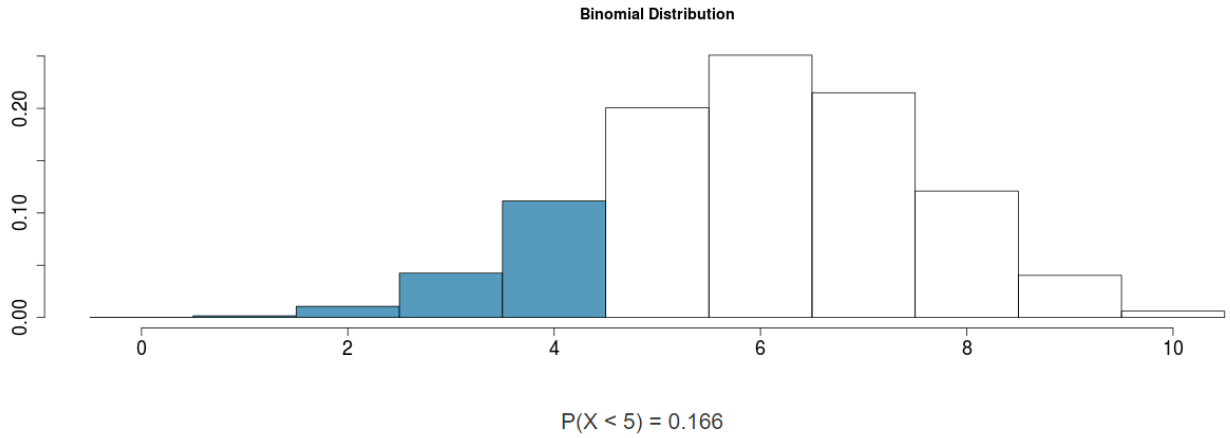

Figure 2:

Greater than or equal to

The probability that X is **greater than or equal** to a: $Pr(X \geq a)$:

$$function(a-1,\ ...,\ lower.tail = F)$$

Example

- $Pr(X \geq 5)$, assume $X \sim Binomial(n = 10,\ p = 0.6)$

```
pbinom(4, size = 10, prob = 0.6, lower.tail = F)
```

```
## [1] 0.8337614
```

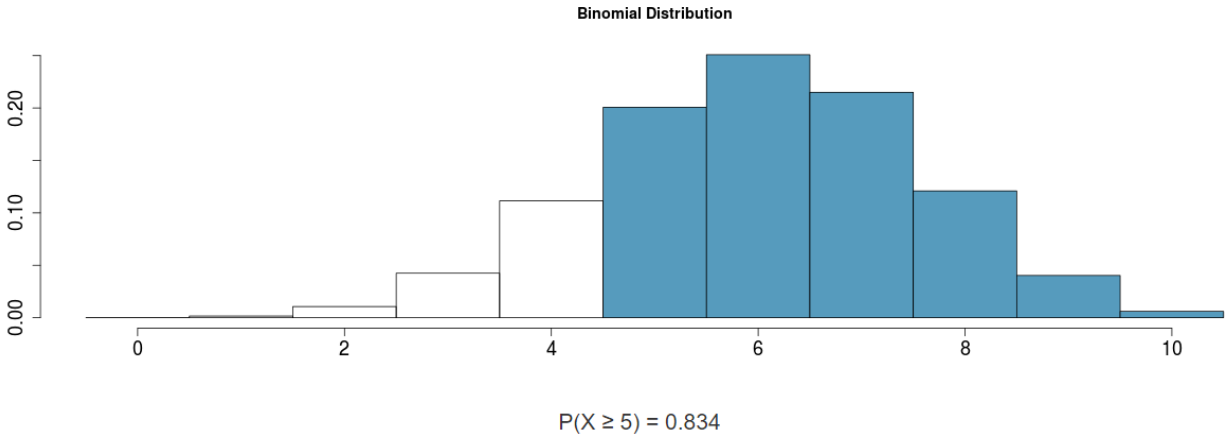

Figure 3:

Greater than

The probability that X is **greater than** a: $Pr(X > a)$:

$$function(a,\ ...,\ lower.tail = F)$$

Example

- $Pr(X > 5)$, assume $X \sim Binomial(n = 10,\ p = 0.6)$

```
pbinom(5, size = 10, prob = 0.6, lower.tail = F)
```

```
## [1] 0.6331033
```

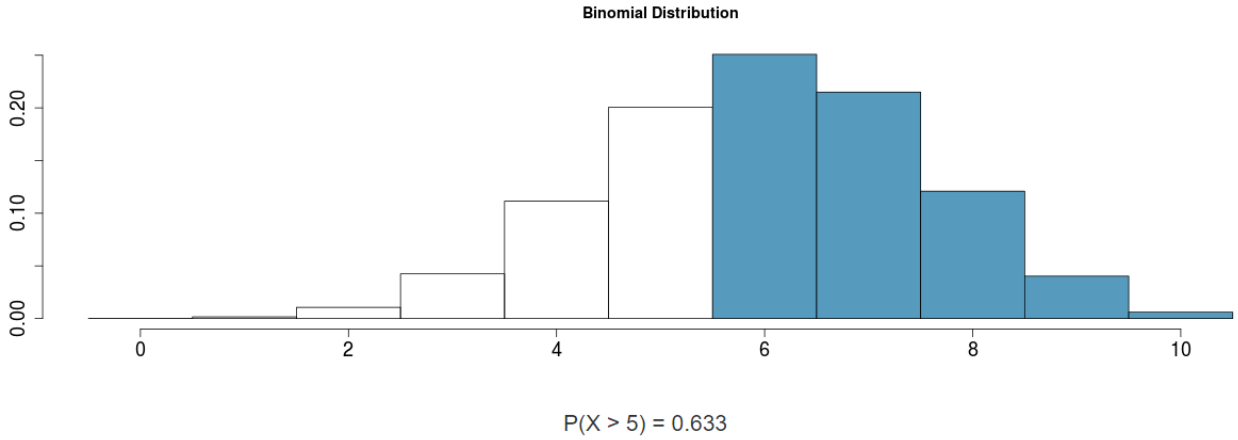

Figure 4: