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Boxplot: The Five Number Summary

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## Boxplot: The Five Number Summary

**Learning Objective: Generate and interpret several different graphical displays of the distribution of a quantitative variable (histogram, stemplot, boxplot).**

### Introduction

Before we move on to the third measure of spread (standard deviation), we'll summarize what we've learned so far about measuring spread and use it to introduce another graphical display of the distribution of a quantitative variable, the **boxplot**.

### The Five Number Summary

So far, in our discussion about measures of spread, the key players were:

- the extremes (min and Max), which provide the range covered by all the data; and
- the quartiles (Q1, M and Q3), which together provide the IQR, the range covered by the middle 50% of the data.

The combination of all five numbers (min, Q1, M, Q3, Max) is called the **five number summary**, and provides a quick numerical description of both the center and spread of a distribution.

#### Example: Best Actress Oscar Winners

We will continue with the Best Actress Oscar winners example (To see the full dataset, click here [🔗](#).)

34 34 27 37 42 41 36 32 41 33 31 74 33 49 38 61 21 41 26 80 42 29 33 36 45 49 39 34 26 25 33 35 35 28 30  
29 61 32 33 45 29 62 22 44

The five number summary of the age of Best Actress Oscar winners (1970-2013) is:

Min: 21

Q1: 30.5

M: 34.5

Q3: 42

Max: 80

### Scenario: Best Actor Oscar Winners

Now let's look at the five number summary of the age of Best Actor Oscar winners (1970-2013). (To see the full dataset, click here [🔗](#).) The five number summary is:

Min: 29

Q1: 38

M: 43.5

Q3: 50.5

Max: 76

### Learn By Doing

1/1 point (graded)

Half of the actors won the Oscar before what age?



43.5

#### Answer

Correct:

The median age for the Best Actor Oscar winners is 43.5, which is the value at which half of the winners fall above and below.

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## Learn By Doing

1/1 point (graded)

What is the range covered by the middle 50% of the ages?



12.5

### Answer

Correct: The middle 50% of the ages is equal to the IQR or  $Q3 - Q1$ :  $50.5 - 38$

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