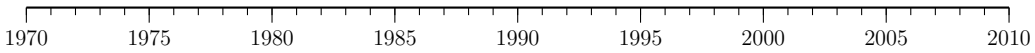
Confidence Intervals **Workshop**

1. In my office I have a bag of 20 quarters. These are the years when the quarters were minted:

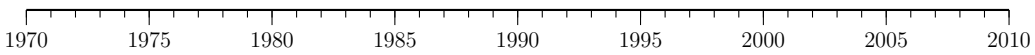
1972	1977	1977	1979	1982	1985	1987	1990	1990	1990
1991	1991	1995	1996	1998	2004	2006	2006	2006	2007

The average year is $\bar{x} = 1990.6$ and the standard deviation is $s = 10.8$ years.

(a) Find the five number summary for this data, then use the number line below to draw a box-and-whisker plot.



(b) Make a 95% confidence interval for the average mint date of all quarters in circulation. Draw the confidence interval using the number line below. Why is the confidence interval so much smaller than the box-and-whisker plot in part (a)?



(c) The quarters in my office have just been sitting in my desk drawer since 2008. Explain why this means that we shouldn't trust our 95% confidence interval for the mean mint date of all quarters currently in circulation.

2. In 2004 the *British Medical Journal* reported on a study showing that dogs can be trained to smell cancer. In one test, six dogs each performed nine trials for a total of 54 trials. On each trial, the dog would sniff seven bowls of urine, one of which was from a bladder-cancer patient. The dogs were trained to sit down by the bowl they thought smelled cancerous. Overall, the dogs were correct on 22 of 54 trials (about 41% of the time).

   (a) Make a 95% confidence interval for the proportion of times the dogs would choose correctly based on this data.

   (b) If the dogs were guessing on each trial, what fraction of guesses would we expect to be correct? (This is the probability of success by randomness alone, denoted p.)

   (c) Does the confidence interval include the number p from part (b)? Can we be confident that the dogs aren't just guessing?