A Problem with Presidents

Report

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December 16, 2022

Introduction

Calculating the basic statistics of the given data reveals that the longest lived president (Jimmy Carter, 98 years) has lived **52** more years than the shortest lived president (John F. Kennedy, 46 years). The mean lifespan of a POTUS is approximately **72** years (as of the current date). Out of the 45 total presidents, there are currently only **6** living presidents. The most frequent ages (in years) for the presidents are **67** and **76** years lived.

1 Tables

1.1 Top 10 Longest Lived Presidents

	PRESIDENT	BIRTH DATE	DEATH DATE	lived_days	lived_years
0	Jimmy Carter	Oct 1, 1924	nan	35869	98
1	George Bush	June 12, 1924	Nov 30, 2018	34504	94
2	Gerald Ford	July 14, 1913	Dec 26, 2006	34133	93
3	Ronald Reagan	Feb 6, 1911	June 5, 2004	34088	93
4	John Adams	Oct 30, 1735	July 4, 1826	33119	90
5	Herbert Hoover	Aug 10, 1874	Oct 20, 1964	32943	90
6	Harry S. Truman	May 8, 1884	Dec 26, 1972	32373	88
7	James Madison	Mar 16, 1751	June 28, 1836	31150	85
8	Thomas Jefferson	Apr 13, 1743	July 4, 1826	30397	83
9	Richard Nixon	Jan 9, 1913	Apr 22, 1994	29688	81

The above image is the result using the *tabulate* package. The formatting style is *fancy_outline* and is printed to the console when running *main.py*. One can also use the *latex* formatting instead that outputs a LaTeX compatible table.

As can be seen, the longest lived president is Jimmy Carter (98 years), who is also still living. The next three longest lived presidents all passed away in the 21st century. The four longest lived presidents were all born in the 20th century.

1.2 Top 10 Shortest Lived Presidents

	PRESIDENT	BIRTH DATE	DEATH DATE	lived_days	lived_years
0	John F. Kennedy	May 29, 1917	Nov 22, 1963	16978	46
1	James A. Garfield	Nov 19, 1831	Sep 19, 1881	18202	49
2	James K. Polk	Nov 2, 1795	June 15, 1849	19583	53
3	Abraham Lincoln	Feb 12, 1809	Apr 15, 1865	20516	56
4	Chester Arthur	Oct 5, 1829	Nov 18, 1886	20863	57
5	Warren G. Harding	Nov 2, 1865	Aug 2, 1923	21091	57
6	William McKinley	Jan 29, 1843	Sep 14, 1901	21412	58
7	Theodore Roosevelt	Oct 27, 1858	Jan 6, 1919	21985	60
8	Calvin Coolidge	July 4, 1872	Jan 5, 1933	22099	60
9	Barack Obama	Aug 4, 1961	nan	22413	61

As can be seen, the shortest lived president was John F. Kennedy (46 years). The rest of the presidents (except Barack Obama) were mostly born in the 19th century. Additionally, Barack Obama is the youngest living president (61 years).

1.3 Statistics (in days)

mean	26423.51111111111
median	26227.0
max	35869
min	16978
mode(years)	[67, 76]
weighted avg.	26423.511111111107

The mode of the data is calculated using $lived\_years$, as $lived\_days$ is too distinct to produce a sensible result (the mode becomes all of the values of $lived\_days$). As such, the data is bimodal, with 67 and 76 as its maxima.

Furthermore, as there are no specified weights, the standard deviation of the distribution (std) is used as the common weight [1]. When all the weights are equal, the weighted average is found to be equal to the mean of the distribution, as expected.

1.4 Statistics (in years)

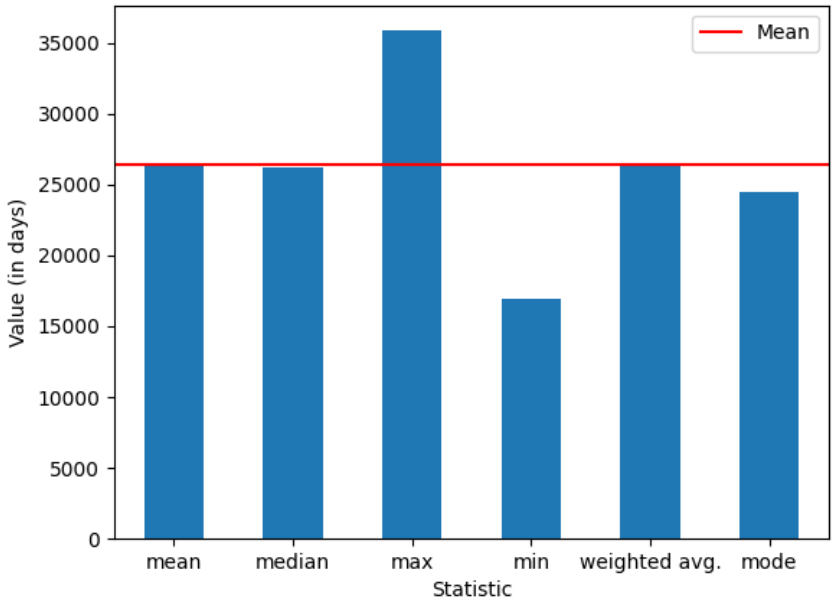
mean	72.34363069434939
median	71.80561259411363
max	98.20396988364134
min	46.483230663928815
mode(years)	[67, 76]
weighted avg.	72.34363069434937

This is similar to the table from the previous subsection, but more readable. The mean age of the presidents is approximately 72 years. The median is quite close to the mean, which implies that the distribution is not skewed badly. This makes sense as the minimum age for presidency is 35 years, and the maximum age cannot deviate in order of magnitudes. The median also implies that 50% of presidents have lived for above 71 years.

2 Plots

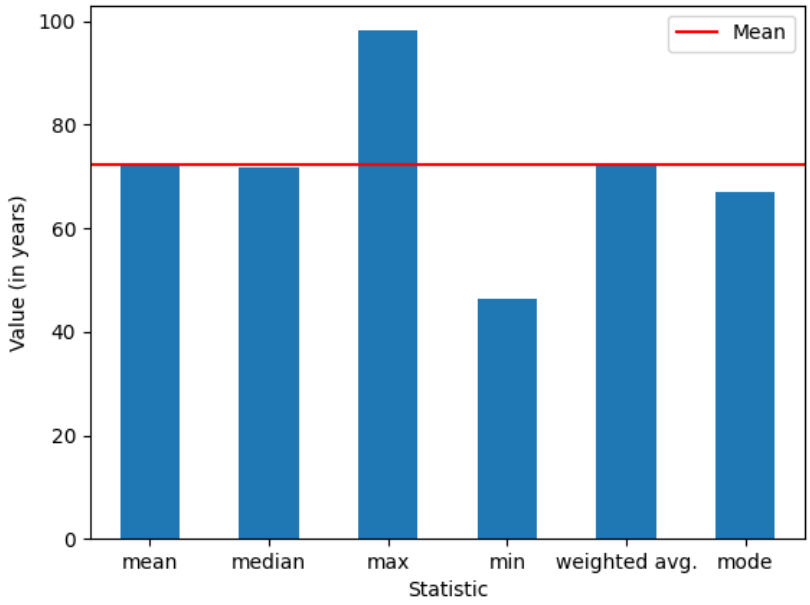
All the plots were made using *matplotlib*.

2.1 Statistics (in days)



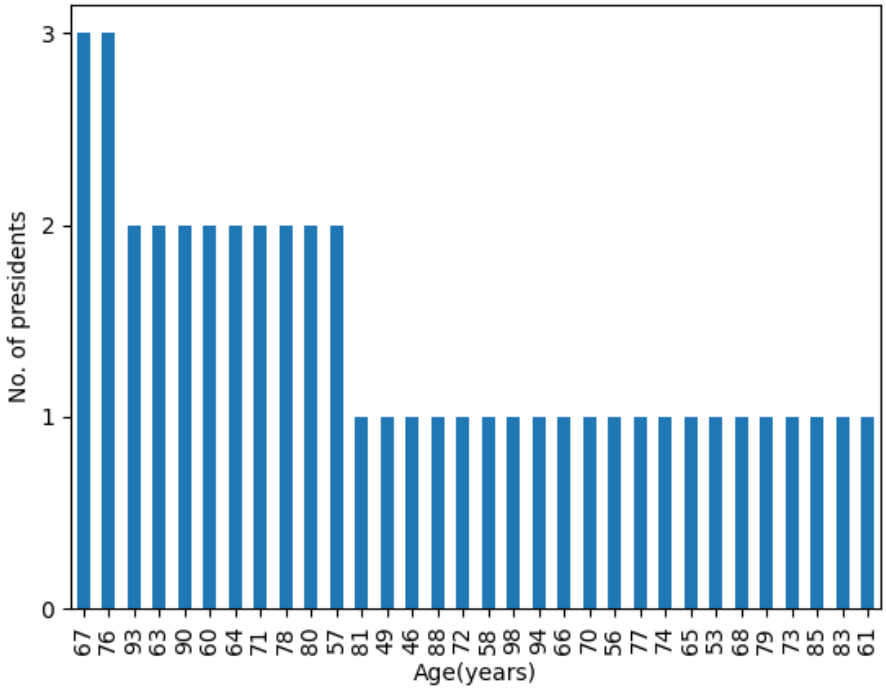
This bar graph is the visual representation of subsection 1.3. The mean and median are close enough that the red line is necessary to show the difference.

2.2 Statistics (in years)



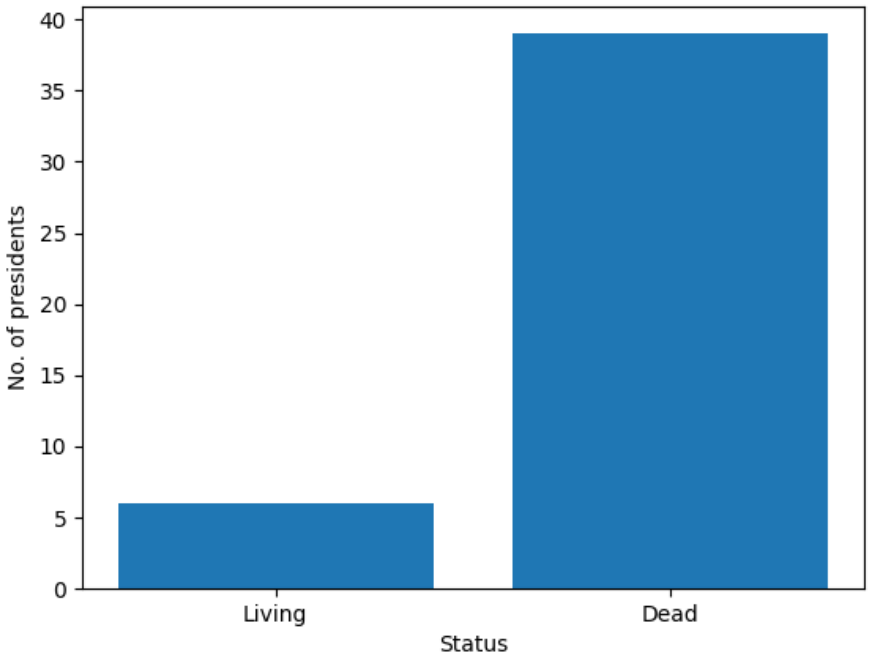
This bar graph is the visual representation of subsection 1.4. It is similar to the graph in the previous subsection, but scaled from days to years for better understanding.

2.3 Statistics (in years)



This plot illustrates the mode (67,76) which appear 3 times each. There are 6 presidents that lived for 67 or 76 years.

2.4 Statistics (in years)



This simple bar graphs illustrates what might seem obvious: there are far less still living presidents than there are passed away. In fact, there are only 6 still living presidents, out of a total 45.

3 Conclusions

The average lifespan of a POTUS is approximately 72 years. The average life expectancy in the USA (circa 2020) is approximately 77 years. Further investigation might reveal if the shortest lived presidents, most of whom were born in the 19th century, were so because of the lack of proper healthcare and such, or due to unrelated causes. Related to this is also the observation that the four longest lived presidents were all born in the 20th century. None of the presidents so far have lived to 100 years.

4 References

[1] https://eng.libretexts.org/Bookshelves/Industrial_and_Systems_Engineering/Book%3A_Chemical_Process_Dynamics_and_Controls_(Woolf)/13%3A_Statistics_and_Probability_Background/13.01%3A_Basic_statistics-_mean%2C_median%2C_average%2C_standard_deviation%2C_z-scores%2C_and_p-value