Who's the Best Home Run Hitter of All time?
Trey Cox, 2014

Activity:

Baseball is known as a sport that is infatuated with statistics. One of the most interesting and sought after titles in major league baseball is "home run king." There have been many claims to the throne. Roger Maris played Major League Baseball from 1957 – 1968, and in 1961 he hit a record 61 home runs for the New York Yankees in a single season. Maris broke the record that Babe Ruth, another New York Yankee, had previously set. In 1974, Hank Aaron of the Milwaukee and Atlanta Braves became the all-time home run hitter, surpassing Babe Ruth. In the 1990s, two players, Mark McGwire of the St. Louis Cardinals and Barry Bonds of the San Francisco Giants, had incredible seasons and both broke Maris' former single-season record. In 2007, amid controversy, Barry Bonds set the record for the most home runs hit in a career (762), passing Hank Aaron. All of these players have retired from the sport, so the controversy rages – which one of them is the greatest home run hitter of all time? It is now your job to settle the matter!

In the table below, the number of home runs hit by each athlete during each season of their careers is listed.

Roger Maris		Mark McGwire		Barry Bonds		Babe Ruth		Henry Aaron	
Season	Home runs	Season	Home runs	Season	Home runs	Season	Home runs	Season	Home runs
1957	14	1986	3	1986	16	1914	0	1954	13
1958	28	1987	49	1987	25	1915	4	1955	27
1959	16	1988	32	1988	24	1916	3	1956	26
1960	39	1989	33	1989	19	1917	2	1957	44
1961	61	1990	39	1990	33	1918	11	1958	30
1962	33	1991	22	1991	25	1919	29	1959	39
1963	23	1992	42	1992	34	1920	54	1960	40
1964	26	1993	9	1993	46	1921	59	1961	34
1965	8	1994	9	1994	37	1922	35	1962	45
1966	13	1995	39	1995	33	1923	41	1963	44
1967	9	1996	52	1996	41	1924	46	1964	24
1968	5	1997	58	1997	40	1925	25	1965	32
		1998	70	1998	37	1926	47	1966	44
		1999	65	1999	34	1927	60	1967	39
		2000	32	2000	49	1928	54	1968	29
		2001	29	2001	73	1929	46	1969	44
				2002	46	1930	49	1970	38
				2003	45	1931	46	1971	47
				2004	45	1932	41	1972	34
				2005	5	1933	34	1973	40
				2006	26	1934	22	1974	20
				2007	28	1935	6	1975	12
								1976	10

a) For each player, compute the five-number summary of the number of season home runs.

b) Make 5 side-by-side boxplots of the home run distributions. Make sure to label each graph with the player's name.

c) Using the analysis of data above, make a case statistically for who you think is the best home run hitter of all time. Be sure to back up your claim with relevant statistics.

d) Consider Barry Bonds' home run counts. Estimate the existence any outliers and provide reasonable explanations (at least 3) for their existence. Be sure to include the numerical value and a potential contextual explanation for any outlier(s).

e) If you had to describe one of the five players as the most consistent power hitter of all time, based on the above graphs and the summaries that you calculated, which player would you say would fit that description?

f) What type of career would a future player have to have in order for you to say that he has dethroned the player you chose in (c)? Be specific in terms of the number of seasons played and the numbers of home runs hit.