Question 7

Table 1: get-stats output

clever	stop-at-17	(stop-at 19)	(majority clever stop-at-17 (stop-at 19))
-109	-80	-207	-101
-114	-62	-217	-142
-84	-50	-211	-20
-87	-67	-252	-128
-108	-108	-190	-96
-129	-63	-218	-72
-109	-44	-196	-99
-119	-95	-185	-123
-113	-105	-195	-84
-132	-43	-153	-97
-68	-96	-164	-115
-79	-10	-186	-103
-74	-105	-177	-140
-123	-44	-152	-82
-116	13	-199	-90
-123	-96	-182	-147
-137	-131	-176	-92
-97	-72	-185	-96
-89	-95	-268	-82
-59	-76	-183	-64
-112	-110	-166	-97
-106	-78	-198	-90
-105	-52	-156	-114
-33	-84	-174	-98
-46	-71	-181	-53
-66	18	-205	-67
-151	-34	-175	-54
-88	-23	-195	-114
-87	-55	-204	-94
-81	-55	-195	-122
-92	-87	-244	-90
-134	-124	-221	-57
-115	-70	-220	-33
-70	-114	-212	-84
-122	-41	-234	-57
-120	-118	-219	-78
-116	-56	-164	-74
-127	-133	-219	-63
-30	-60	-201	-92
-138	-53	-149	-65
-68	-114	-223	-72
-83	-91	-211	-99
-95	-52	-219	-95
-57	-96	-174	-42
-117	-32	-224	-62
-85	-91	-202	-63
-56	-23	-246	-107
-172	-55	-230	-69
-76	-61	-207	-51
-98	-85	-193	-126

As can be seen in *Table 1*, I ran the get-stats procedure on four different strategies. I used a repeat-count value of 1000 and a data-points value of 50 for all four strategies. I kept the values of repeat-count and data-points the same for all the strategies in order to make a fair comparison. I chose a large repeat-value in order to provide to more accurately portray the average behavior of the strategies. I chose a relatively large value for data-points in order to have enough samples to perform an accurate analysis on.

My reasons for choosing these particular strategies are as follows: I chose stop-at-17 because it was given and it was the inspiration for stop-at; I chose clever because it is quite a comprehensive strategy; I chose stop-at with an argument of 19 in order to compare how stopping at 19 would compare to stopping at 17; I chose majority with the other three functions being its argument to see how the average decision of the three strategies would compare to their individual strategies.

Table 2: Summary of the data

SUMMARY					
Strategies	*Count*	*Sum*	*Average*	*Variance*	*Standard Deviation*
clever	50	-4915	-98,3	892,5	29,87473849
stop-at-17	50	-3529	-70,58	1186,901633	34,45143876
(stop-at 19)	50	-9957	-199,14	720,735102	26,84651005
(majority clever stop-at-17 (stop-at 19))	50	-4355	-87,1	780,9081633	27,94473409

Table 2 shows a summary of the data collected. *Figure 1* shows the average amount of wins minus losses of the four strategies and *Figure 2* shows the standard deviation of wins minus losses of the four strategies. It is interesting to note that clever has a lower average than stop-at-17 but a better average than (stop-at 19). This shows that stop-at is a good strategy provided it is stopping at the right number. Clever is a good strategy as its average is not much lower than stop-at-17's. (Stop-at 19) is a poor strategy as its average is far worse than clever's. Majority performed better than clever but worse than stop-at-17, showing that the average decision of the three functions performs better than the individual decisions of two of the functions but still not as well as stop-at-17. Stop-at-17 has the highest standard deviation, so that means that its result varies the most in terms of average performance. This means that it is less reliable. Unsurprisingly, majority has the lowest standard deviation, making it most likely to perform close to its average.

The averages for all the functions are well below zero, meaning that the dealer wins the majority of the time, regardless of strategy. I do not think an interactive system with a user deciding to hit would perform better than all of these functions, other than by chance, as I don't foresee a human making many better decisions than the clever strategy.

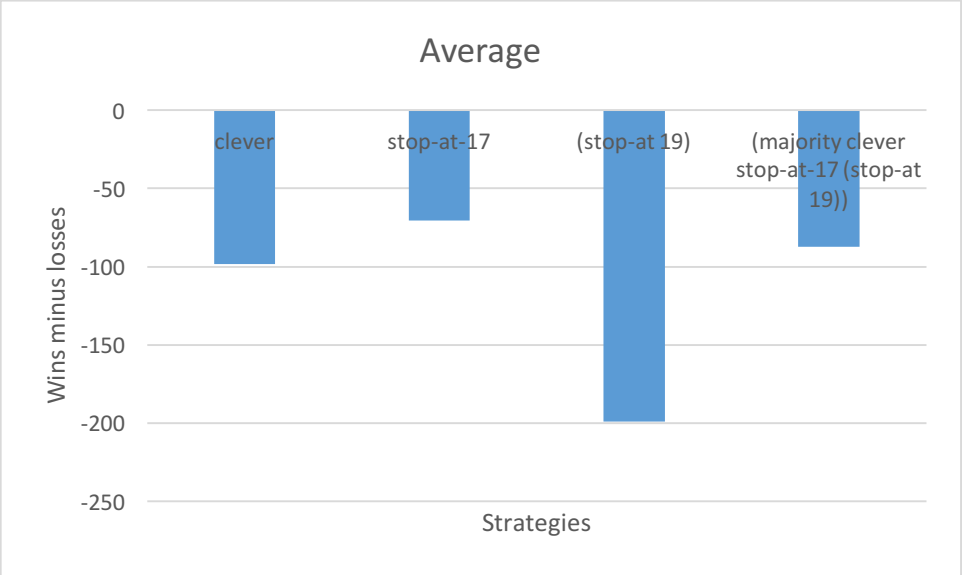

Figure 1: Average wins minus losses

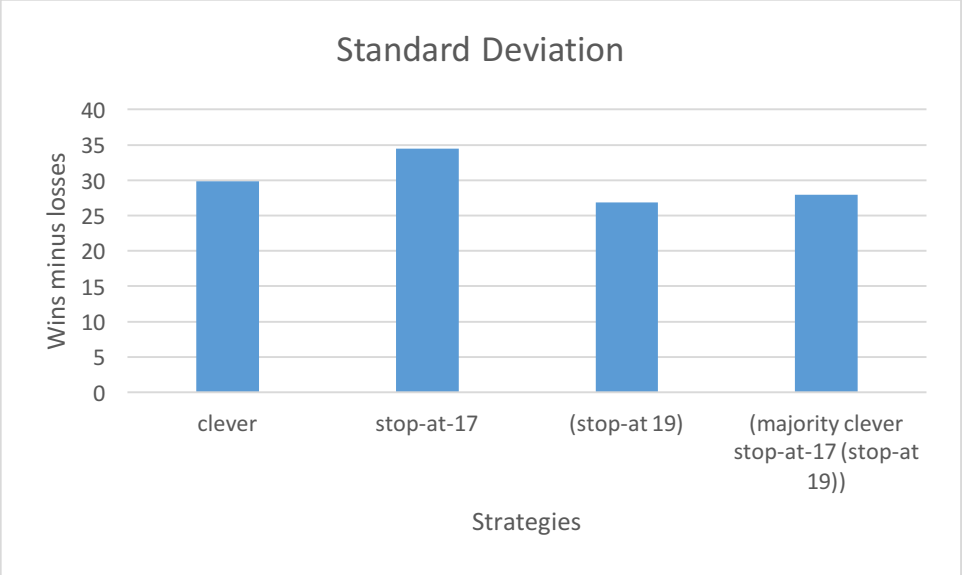

Figure 2: Standard deviation of wins minus losses