3. Choose the best data type for each of the following so that any reasonable value is accommodated but no memory storage is wasted. Give an example of a typical value that would be held by the variable, and explain why you chose the type you did.

a. the number of siblings you have **For most people, the value is no more than 10 or 12, so the number would easily fit in a byte. If you count half siblings, you might need a short because an Emperor in Morocco in the early 1700s had more than 800 children.**

b. your final grade in this class **The answer depends on the grading system in your school If the grade is a letter, such as A, then you would use a char. If the letter grade includes + or -, such as A+, then you need a String. If the value is a percentage, such as 88, then a byte would be sufficient.**

c. the population of Earth **The population of earth is over 7 billion, so you need a long.**

d. the population of a U.S. county **The largest county in the U.S. is Los Angeles county in California. The population is about 10 million, so you would use an int.**

e. the number of passengers on a bus **A byte would be sufficient for almost all busses.**

f. one player’s score in a Scrabble game **The highest score ever achieved was about 800, so you could use a short.**

g. one team’s score in a Major League Baseball game **The highest score in history is 29 runs, so a byte is more than sufficient.**

h. the year an historical event occurred **If you use only years since year 0, then a short is sufficient. If you use negative numbers for years B.C., and you include the entire history of the earth, you need a long because the earth is believed to be more than 4 billion years old. If you want to include “A.D.” or “B.C.” with dates, then you need a String.**

i. the number of legs on an animal **If you interpret *animal* to mean *mammal*, then you can use a byte. Some centipedes have 200 legs however, so you would need a short.**

j. the price of an automobile **If you assume that the price is in whole dollars, then an int is the best choice.**