You should hand in your script files and any necessary output from your script. You may not discuss this project with anyone but me.

Many years ago, students on the playground would collect plastic football helmets (see figure below) that were sold in gumball machines. The goal was to try and get one of every helmet. This was somewhat easier

back then because there were only 28 teams. Of course, no one ever even got close to getting a whole set. This is because the helmets cost $0.25 each and back then this was a lot of money for a third-grader. I think the most any one had was 8.

In this project, you will estimate how much it would cost to obtain a full set of 32 helmets. Assume you are still buying them from a gumball machine and that they cost $0.50 each. The basic idea of your simulation is simple: Generate random integers from 1 to 32 until you have generated all integers from 1 to 32.

First write a script that will count the number of helmets you would need to buy in order to collect a complete set of 32. HINT: Start with a column vector of all zeros of length 32. Stop when..... Your total cost will be the number you had to buy (n) times $0.50.

Your script above will give you one estimate of the number you need to buy, however this is going to change due to the nature of random numbers. The first time you run the script, you may need to buy 46 helmets. You may need to buy 65 the second time and 53 the third time, *etc.*. What you need to ultimately do is to take the script above and run it many, many times and compute an average number of helmets. Keep increasing the number of times you have to run the first script until this average number stabilizes.

Once your script is working, use it to answer the questions below:

1) How much would it cost to purchase an entire set of helmets this way?

2) Compare this cost with how much it would cost to just buy then entire set outright. For this answer, you should get several costs from various online vendors and average them (note: don't use ebay for this part).

3) Is is cheaper to try and get them from a gumball machine or just buy the set outright? How much cheaper?

4) In writing your script, you actually made several critical assumptions. What are these assumptions?