Programming Assignment 2 Ben Anandappa and Christi Balaki

Part 1

- In standard matrix multiplication, multiplying two nxn matrices by each other has the following costs:
  - Multiplication: n^3 steps
  - Addition: $(n-1)n^2$ steps

  Together, the total cost of the standard algorithm is $n^3 + (n-1)n^2 = (2n-1)n^2$

- In Strassen's method, we can calculate the total cost by first calculating the costs of P_1 to P_7 as described in the lecture notes and the costs of the additions/subtractions of these products.

  From the notes, we have the submatrices A, B, C, D, E, F, G, H which are of size n/2 and the following 7 products:
  - $P_1 = A(F - H)$
  - $P_2 = (A + B)H$
  - $P_3 = (C + D)E$
  - $P_4 = D(G - E)$
  - $P_5 = (A + D)(E + H)$
  - $P_6 = (B - D)(G + H)$
  - $P_7 = (A - C)(E + F)$

  of which we can use to make:
  - $AE + BG = P_5 + P_4 - P_2 + P_6$
  - $AF + BH = P_1 + P_2$
  - $CE + DG = P_3 + P_4$
  - $CF + DH = P_5 + P_1 - P_3 - P_7$

  For a $n * n$ matrix, the cost C(n) can be

  Note that the cost of P_1, P_2, P_3 and P_4 are the same ad