1. A restaurant’s menu consists of: 2 soups, 3 appetizers, 4 salads, 5 entrees, 6 desserts, and 7 beverages. How many distinct dinners can they serve if each dinner contains: (a) a soup, an appetizer, a salad, an entree, a dessert, and a beverage? (b) one appetizer, one of either soup or salad, one entree, and one of either a dessert or a beverage?

2. How many ways can 4 married couples sit at a dinner table if: (a) the table is long and narrow (like a bar!) and each couple must sit together? (b) the table is circular and one of the couples cannot sit next to one another?

3. How many ways can I permute the letters of the word BASEBALL?

4. How many strings of length 15 from the alphabet \{a,e,i,o,u\} contain exactly three of each character?

5. (a) Expand \((x + y)^5\) using the binomial theorem. (b) Prove or disprove that the coefficient of \(x^{14}y^{17}\) equals the coefficient of \(x^{17}y^{14}\) in the expansion of \((x + y)^{31}\).

6. Prove: \[
\frac{P(n,r)}{r!} = \frac{P(n-1,r-1)}{(r-1)!} + \frac{P(n-1,r)}{r!}
\]

7. Using the Iteration Method, solve :\(s_n = 5s_{n-1} + 2\) with \(s_0 = 1\).

8. What LHSORRCC has general solution: \(s_n = (A + Bn)(-3)^n\)?

9. If \(s_n = 12s_{n-1} - 35s_{n-2}\), and \(s_0 = -1\) and \(s_1 = 1\), find an expression for \(s_{1000000}\). (Hint: 12s999999 -35s999998 is not what I am looking for!)

10. What is the order of the following functions: (a) \(f(x) = 2x - 7\) (b) \(f(x) = 3x^2(2x^3 + 5x^2 - 4x + 1)\) (c) \(f(x) = (\log B x)(x^2 + 1)\) (d) \(f(x) = x!\)

11. What is the order of the loop given in the following lines of code:

   FOR I = 1 TO N; FOR J = 1 TO N; FOR K = 1 TO N
   P = P + 1;
   NEXT K; NEXT J; NEXT I;

12. Given sorted array of the integers 1, 2, ..., 100, how many steps will a sequential search require to find 36? a binary search require to find 36?