This assignment contains 1 pages (including this cover page) and 4 questions. Total of points is 100.

Conditions: All work must be completed individually. No outside resources are permitted. The only permitted resources are your texts and class notes.

Write or type your answers neatly and clearly. Include your name and Net ID. Follow submission instructions as indicated on Canvas.

1. (10 points) Based on your Polynomial class implementation, draw a UML class diagram(s) (include any helper classes). Include all members, parameters and types. (Be clear as to whether your implementation uses chaining or contiguous allocation.)

2. (20 points) Draw a flow diagram for the multiplication method for your Polynomial class. Note all assumptions about the state of the two polynomials prior to the multiplication.

3. (40 points) Consider the multiplication method. Assuming two polynomials $a_n x^n + ... + a_i x^i + ... + a_0$ with N non-zero coefficients and $b_m x^m + ... + b_i x^i + ... + b_0$ with M non-zero coefficients, what is the worst case time and space complexities using (tight-fitting) Big-O notation assuming

   A. a contiguous (array) implementation

   B. a chaining implementation

   Note n and N are different. Please state any necessary assumptions about each implementation to appropriately answer these questions.

4. (30 points) Identify and describe two input cases (for polynomial multiplication) as follows. Case 1: array implementation is more efficient in time and space as compared to a chaining implementation. Case 2: chaining implementation is more efficient in time and space as compared to an array implementation.