

PHASE 2 (PART 2): POLYNOMIAL INTERPOLATION

1.] Suppose you want to interpolate the points $(-1, 0)$, $(0, 1)$, $(2, 0)$, $(3, 1)$, and $(4, 2)$ by a polynomial of as low a degree as possible.

a.) What degree should you expect this polynomial to be?

b.) Write out a linear system of equations for the coefficients of the interpolating polynomial.

c.) Create a Python program that solves this system numerically and report the solution below.

- 2.] The table below shows the population figures (in millions) for three countries over the same 30-year period. Plot the data and interpolating polynomial on the same graph.

Year	United States	China	Germany
1980	227.225	984.736	78.298
1990	249.623	1148.364	79.380
2000	282.172	1263.638	82.184
2010	308.282	1330.141	81.644

Create a single file that outputs the following:

- a.) Use cubic polynomial interpolation to estimate the population of China in 1992.
- b.) Use cubic polynomial interpolation to estimate the population of the USA in 1984.
- c.) Use cubic polynomial interpolation to make plot of the German population from 1980 to 2010.
Your plot should show a smooth curve and be well annotated.