A Mandelbrot is a mathematical set that is defined in terms of a complex number. It is named after Benoit Mandelbrot, who is credited with its discovery in 1980. To code a Mandelbrot in python, we first need to import the complex math module. Then, we can define a function that takes in a complex number and returns the Mandelbrot value for that number. The Mandelbrot value is calculated by iterating the equation z = z^2 + c, where z is a complex number and c is a complex constant. If the absolute value of z remains less than 2 after 100 iterations, then the point is considered to be in the Mandelbrot set.

A Markov Chain is a mathematical model used to predict the probability of future events, based on the assumption that the past and present states of a system are unrelated to each other. The Markov Chain is named after Russian mathematician Andrey Markov, who first proposed the model in the early 20th century. Markov Chains are used in a wide variety of applications, including predicting the weather, stock market prices, and the spread of disease. The most basic form of a Markov Chain is a two-state model, in which there are only two possible outcomes for each event. For example, a coin flip can either result in heads or tails. The probability of each outcome is determined by the previous state of the system. If the last event was heads, then the probability of the next event being heads is 50%. However, if the last event was tails, then the probability of the next event being heads is 100%. More complex Markov Chains can have more than two states. For example, a model of the weather could have states for sunny, cloudy, and rainy. The probabilities of each state would be determined by the previous state of the weather. If the last event was sunny, then the probability of the next event being sunny, cloudy, or rainy would be 33%, 33%, and 34%, respectively.