**NumPy Exercise 4**

In the realm of Medical Data Science, there was a renowned research institute known as NumMed. The brilliant minds at NumMed were dedicated to unraveling the mysteries hidden within vast datasets collected from patients worldwide. Driven by their passion for improving healthcare, they embarked on a fascinating journey of data exploration and analysis.

Step 1: Collecting the Data

In their quest for knowledge, the researchers gathered diverse medical data from various sources. One dataset, called "patient\_vitals", contained vital sign measurements (such as blood pressure, heart rate, and temperature) for 100 patients. It was represented as a 2-dimensional NumPy array with shape (100, 3). Another dataset, known as "lab\_results", contained laboratory test results (such as cholesterol level, glucose level, and white blood cell count) for the same 100 patients. It was also represented as a 2-dimensional NumPy array with shape (100, 3).

Step 2: Combining the Data

To gain a comprehensive understanding of each patient's health profile, the researchers combined the lab\_results dataset with the patient\_vitals array. This combined dataset contained both the vital sign measurements and laboratory test results for all 100 patients.

Step 3: Statistical Analysis

With the combined dataset in hand, the researchers delved into statistical analysis. They calculated the mean and standard deviation of each column in combined\_data. The mean values provided insights into the average health indicators, while the standard deviations revealed the variability within each measurement.

Step 4: Identifying High-Risk Patients

In their pursuit of improving patient care, the researchers aimed to identify high-risk patients. They focused on the cholesterol level and blood pressure measurements. By extracting the corresponding columns from combined\_data, they isolated these crucial indicators. Using a stacking technique, they formed a new 2-dimensional array named "risk\_factors". This array contained cholesterol levels and blood pressure measurements for all patients.

Step 5: Extracting Abnormal Results

To further narrow their focus, the researchers sought to extract patients with abnormal test results. By applying conditional statements and Boolean indexing, they identified patients with cholesterol levels exceeding a specific threshold and blood pressure readings outside the normal range. This process resulted in a subset of combined\_data, containing only the data for the patients with abnormal results.

Step 6: Medical Insights

In the pursuit of medical insights, the researchers delved into the abnormal subset of combined\_data. They analyzed the values of each measurement, gaining insights into potential health conditions and correlations. These insights provided valuable clues for further investigation and medical interventions.

And so, the researchers at NumMed demonstrated the power of NumPy in the realm of Medical Data Science and Analytics. Their journey through reshaping, combining, and analyzing medical datasets unveiled vital information for improving patient care and unraveling the mysteries of human health. Their dedication to leveraging the capabilities of NumPy showcased the potential for data-driven advancements in medicine, bringing hope to countless lives.