Team Number: 3
School Name: San Juan College High School
Area of Science: Biology
Project Title: Genetics and Breast Cancer

Problem Definition: The scientific world of Genetics hasn't been around for all too long. The world of genetics is still incredibly young and ready to develop and share many new discoveries and advancements with our society. Including the ever-evolving world of cancer treatment. Cancer can be obtained in a great number of ways, but the focus of today is how cancer is obtained through hereditary traits. In today's world of science there is still no real cure for Cancer, but even without a cure, there are still many different ways to fight against the disease. What this project hopes to find is a pattern Cancer follows by analyzing past behaviors of the disease in families with a history of Cancer. I have chosen Breast Cancer as the type of cancer to study based off of the sheer number of patients I've seen affected in America. The study of Breast Cancer itself is still very broad, but with this project, I hope to bring new information to this ever-evolving world.

Problem Solution: Data will be collected to build the program around, and to test the accuracy of the program. Data from four families with a history of Breast Cancer will be collected. Using data collected from affected families the computer will predict the next most probable family candidate using data from another family member affected. Factors used for analyzation will be found in the candidate's DNA and already affected family members. The programmer will then analyze the data collected by the computer to look for vulnerable traits Breast Cancer tends to more commonly effect.

Progress to Date: Presently research has been conducted on the vulnerabilities of the human cell. Research has led to several discoveries about the different types of vulnerabilities in a human cell depending on the family's history of genetic changes or mutations. Vulnerabilities (factors) have been identified as weak cell growth, malfunctions in the cells reproductive cycle, and a genetic mutation from the biological mother or father of a given child. A starting point has been identified in each of the four families. The so-called "starting point" defines the very first person to have been affected or associated with Breast Cancer. A scenario has been set-up to search the "starting-point" for vulnerabilities or factors and listing findings in a table after vulnerabilities occur more than 100 times in a given time period. Further development of the scenario includes analyzation of the vulnerabilities to predict the path the Breast Cancer is more likely to follow.

Expected Results: After programming, testing, and refining of the program being created in this project, the final system could help affected families in planning for their next move. The program in its higher stages would be able to help in accurately measuring and predicting the probability or danger of a patients stage of Breast Cancer. The program could be later implemented in hospitals and cancer treatment centers to help in analyzing a patient's condition using their family's lineage and past in Breast Cancer. Families already knowledgeable of their past with the disease could get tested and take steps to help prevent

present family members from being affected. After years of this programs testing stage, a decrease in the number of Breast Cancer patients is highly expected and anticipated.

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