**Level 1: Charles Babbage & Ada Lovelace**

1. Who was Charles Babbage?
   1. When and where was he born?

December 26, 1791, London, United Kingdom

* 1. What was his main contribution to computer science?

Babbage is credited with inventing the first mechanical computer that eventually led to more complex electronic designs, though all the essential ideas of modern computers are to be found in Babbage's analytical engine

1. What is the "Difference Engine" proposed by Charles Babbage?
   1. What did it do?

Automatic mechanical calculator designed to tabulate polynomial functions.

* 1. How did it work?

Its name is derived from the method of divided differences, a way to interpolate or tabulate functions by using a small set of polynomial coefficients. Most mathematical functions commonly used by engineers, scientists and navigators, including logarithmic and trigonometric functions, can be approximated by polynomials.

* 1. How was it similar to modern computers?

1. Who was Ada Lovelace?
   1. When and where was she born?

December 10, 1815, London, United Kingdom

* 1. What was his main contribution to computer science?

English mathematician and writer, chiefly known for her work on Charles Babbage's proposed mechanical general-purpose computer, the Analytical Engine. She was the first to recognize that the machine had applications beyond pure calculation, and published the first algorithm intended to be carried out by such a machine.

* 1. What is the computer language that is named after her?

Ada, the language, was developed in the early 1980s for the U.S. Department of Defense

1. What is the "Analytical Engine" worked on by Ada Lovelace?
   1. What did it do?

The Analytical Engine was a proposed mechanical general-purpose computer designed by English mathematician and computer pioneer Charles Babbage.

* 1. How did it work?

the logical structure of the Analytical Engine was essentially the same as that which has dominated computer design in the electronic era. The Analytical Engine is one of the most successful achievements of Charles Babbage.

* 1. How was it similar to modern computers?

**Level 2: Alan Turing**

1. Who was Alan Turing?
   1. When and where was he born?

June 23, 1912, Maida Vale

* 1. What was his main contribution during World War II?

Turing served the Allied forces by breaking German military codes, particularly those used by the German navy.

* 1. What were his main contributions to computer science after World War II?

Turing Test: turing was also involved in philosophical debates over whether machines could think like a human brain. He devised a test to answer the question. He reasoned that if a computer acted, reacted and interacted like a sentient being, then it was sentient.

1. What is the "Enigma" that Alan Turing worked on during World War II?
   1. What was the "Enigma code" used by the Germans and how did it work?
   2. Why was it so important for Britain to "crack" the Enigma code?
   3. How did Alan Turing solve the puzzle?
   4. Why was Turing's work kept top secret?
2. Many people call Alan Turing the "Greatest Unknown Hero of World War II". Provide some examples of the impact of his work that would support this claim.
3. How did being gay affect Alan Turing's life and work as a computer scientist?
   1. How did being gay affect his work during World War II?
   2. How did being gay affect his work after World War II?
   3. How did Alan Turing's life end?
4. Many people call Alan Turing the "Father of Computer Science". Provide some examples of the impact of his work that would support this claim.

**Level 3: Other Great Contributors**

1. Who was John von Neumann?
   1. When and where was he born?
   2. When and why did he move to America?
   3. What was his contribution to mathematics & science?
   4. What was his contribution to computer science?
2. What was the "ENIAC" computer and the "von Neumann Machine"?
   1. What did it do and how did it work?
   2. How is it related to modern computers?
   3. Explain how a "von Neumann Machine" applies to modern PCs.
3. Who was Grace Hopper?
   1. When and where was she born?
   2. What were some of her contributions to computer science?
4. What was the "COBOL" computer language that Hopper helped to develop?
   1. How was COBOL different from other computer languages of the time?
   2. Is COBOL still in use today? Explain your answer.
5. Who is Tim Berners-Lee?
   1. When and where was he born?
   2. Why was he knighted by Queen Elizabeth II?
   3. What is his contribution to computer science?
6. List some ways that your life would be different if Tim Berners-Lee did not invent the World Wide Web.

**Level 4: Presentation**

Pick one of the above "heroes" of computer science and prepare a brief presentation about their life and contributions.

Your presentation will be shared with other students in the class in a "trade show" format. (When we return form Christmas break.)

Your presentation should be shared with Mr. Nestor through Google Docs or via email at p0079141@pdsb.net.