CSU33012
SOFTWARE ENGINEERING
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BIOGRAPHY OF A SOFTWARE ENGINEER.

Grace Murray Hopper.

Introduction.

There are many engineers who have contributed to the field of computer science, one of the most influential software engineers who has undeniably played a critical role to the development and progression in the field of computer science is Grace Murray Hopper.

Early Life.

Grace Brewster Murray Hopper was born in New York City on December 9th 1906 to parents Walter Murray and Mary Murray. [1] It is clear that her parents had a positive influence on Grace's interest in math and science. Her father was an insurance broker, he encouraged her to have ambition beyond what would be considered a feminine role in that era.[2] Her mother was the daughter of a civil engineer, she went surveying with her father (Grace's grandfather) and had a strong liking for mathematics and science.[3]

Grace attended private education and in a conservative presbyterian girls school from 1912 to 1923. She attended the Grahams school from 1916 to 1923 and Miss Mary Schoomakers school.[4] She studied math and physics at Vassar College in Poughkeepsie, New York and she graduated in 1928.[5] Hopper, in 1930 then achieved a masters degree in Mathematics and in that same year she married Vincent Foster Hopper. Vincent was an academic whose field was in literature.Hopper and Vincent stayed married for 15 years before divorcing in 1945 although divorced, her name still remained Grace Hopper.

Hopper achieved her PhD in Mathematics from Yale University in 1934 while working as a professor of mathematics at Vassar College.[6]

Career.

 In 1941 Hopper made an attempt to join the military to support war efforts but was rejected due to her height to weight ratio, determined to support the US Hopper resigned from working in academia to work in the Navy's women accepting voluntary services upon signing a waiver for her height in 1943.[7]
This move proved to be one of the critical events which would lead Hopper to make the highly regarded contributions to computer science that she did.
In 1943 Hopper was sworn into the United States Navy Reserve and as a result of her mathematical background she was assigned to work on the Bureau of Ordnance Computation project at Harvard [8], which she worked on the Mark 1, a 15 meter long and 2 meter high computer built by IBM.
The Mark 1 was used to make calculations which would aid the Military's war efforts.

In 1949 Hopper joined the Eckert-Mauchly Computer Corporation there she worked on developing the UNIVAC 1 which was the first known large scale computer to be enter the market in 1950.[9]

Hopper released her first paper on the subject of compilers in 1952
Hopper and her team was credited for creating the A-0 system, the first computer compiler for modern computers in 1952.[10] A compiler is a program that translates human readable code into machine executable code.

Hopper proposed while working as director of Automatic programming that data processing problems should be expressed in a form in which would be more easily understandable to non specialist programmers but her idea was in fact dismissed as being infeasible by Remington Reid management in late 1953 but by 1955 Hopper and her team implemented a prototype of The FLOW-MATIC language which was based on the A0 compiler, the language became publicly available in 1959.

Hopper retired from the Navy at age 66 with the rank of commodore also known as rear admiral in 1966 but in 1967 she was recalled to duty for an indefinite assignment, during her assignment She was promoted to captain in 1973 she finally retired in 1986, aged 79.

Impact of her work.
Hopper's drive for innovation was clear throughout the work she did, she went beyond what was considered the normal way to do things and proposed and executed on her ideas even when she was not met with ample support.

"Humans are allergic to change. They love to say, 'We've always done it this way.' I try to fight that. That's why I have a clock on my wall that runs counter-clockwise."
Grace Hopper.[14]

This can be seen evidently from when Hopper proposed FLOW-MATIC while working as the Director of Automatic Programming at Remington Rand..

It goes without saying that the work done by Hopper was transformative to the field of computer science. Her ability to make overcome objections were truly admirable Had she not continued to work on her research in building the A-0 compiler the way we interact with computers today could be a completely different experience to what it is today.
Had Hopper given up on her goal of supporting the United States war effort at the first objection she would not have been able to develop the FLOW-MATIC language which alongside COMTRAN were the foundation to COBOL language. A language which by the year 2000 would have 240 billion lines of code written, out of 340 billion lines of existing code at that time and is still widely used today.[15]

In the era in which Hopper lived her industries of work, academia and in the navy were male dominated spaces yet, this did not let this stop her to make outstanding contributions to either field.

In May 1955 Hopper was one of the founding members of the Society of women engineers. A non profit organisation which today is the world's largest advocate and catalyst for change for women in technology[10].

In 1973 Hopper was the first woman to be made a distinguished fellow of the British computer society.This award and fellowship is given to those who have made an outstanding contribution to the advancement of computing[13]

It is clear many women have taken inspiration from her work. The annual Grace Hopper celebration of women in computing is an event which brings women of all backgrounds together to network and collaborate[12].

I believe Hopper's work can serve as inspiration for young women who aspire to work in the computer science industry or in the military who have concerns about gender imbalance.

One of the many reasons why I chose Grace Hopper is the way learning about how she leveraged her own personal curiosity to solve problems and this changed the way I view software engineering and problem solving.

"If I had asked people what they wanted, they would have said faster horses."

This quote is often attributed to Henry Ford, who is often referred to as the grandfather of the assembly line. It is unknown if he ever uttered this phrase but when learning about Grace Hopper I came to believe this quote represented the way that Hopper viewed problem solving. The essence being the commonly shared or agreed upon solution may not always be the most efficient and that if you can produce a better or more efficient solution the world will be appreciative of it.

I would consider my initial view of contributing to the software engineering industry as being one dimensional. Building upon what others have built and doing things *"the way they have always been done"* rather than looking at outside the box ways to solve problems and increase the efficiency of already existing and working solutions. Studying Hopper's work allowed me to become a more lateral thinker when problem solving and I believe this will be a valuable asset growing as a software engineer.

All around the world it is undeniable the impact that Grace has had in computing. Today, Grace has been and continues to be an inspiration to computer scientists and other scientists alike.

sources:

[1]https://www.thoughtco.com/the-younger-years-of-grace-murray-hopper-4077488

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[4]https://www.famousscientists.org/grace-murray-hopper/

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[13]]https://web.archive.org/web/20160304025814/http://www.bcs.org/content/conWebDoc/1650

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