Software Engineering

It takes software to harness the power of computers. That's where you, as a Software Engineer, can come in. Software Engineers are computer science professionals who use knowledge of engineering principles and programming languages to build software products, develop computer games and run network control systems. (Wouldn't it be fun to work on computer games all day!?)

With the proper qualifications, a Software Engineer can work in almost any industry with any type of organization. The demand for high-performing computer Software Engineers continues to grow. According to the Bureau of Labor Statistics, job growth should increase much faster than the national average at 24% through 2026.

Learn more here from Mayuko, a recent graduate, on what she does as a Software Engineer.

Meet Amy Phan, Software Engineer

Amy has a B.S. in Computer Science from the California State Polytechnic University at Pomona. She now works as a Software Engineering at Northrop Grumman in Rosemead, California.

Why did you pick Software Engineering?
As a kid, I was always curious about everything on the computer. I would often go on different desktop applications on my family's computer and wanted to know how the application was made. Sometimes my curiosity led me to accidentally break things on the family computer. But this desire to learn how a computer worked eventually led me to a career in Software Engineering.

Have you done anything really cool with your degree so far?
Some really cool stuff I have worked on include a project to create a common communication data link between different types of autonomous vehicles and doing research on how an Unmanned Aerial Vehicle can navigate without GPS on Mars.

What ways can Software Engineering be used to help society?
Software Engineering at this point in time is already being used in many ways to help society. There is software in just about every field. They range from software used to automate our homes to software used in the medical field to provide better care for patients. However, this doesn't mean that there can't be more ways for Software Engineering to better society. For instance, I foresee Software Engineering helping society further its goals in space exploration to simply providing tools to help people learn new things. There are endless possibilities.

Do you have any advice for young girls who want to be an Engineer?
My advice for young girls who want to be an engineer is always be open to new ideas and keep learning. Never let that spark of wanting to learn something new disappear. Software Engineering thrives on new ideas.

Meet Stephanie Gamboa, Software Engineer

Stephanie has a B.S. in Computer Science from the California State Polytechnic University at Pomona. She now works as a Software Engineer at Northrop Grumman in Carson, California.

Why did you pick Software Engineering?
The idea first happened during a high school lunch with friends. I said out loud to my friends, "I'm thinking of choosing Computer Science as a major for college." Mainly because I found out how much money one could make being a Software Engineer. I had a friend scoff at me because I was not good at math or physics. She said, "You? Computer Science?" And since that conversation, I was absolutely motivated to prove her wrong.

Have you done anything really cool with your degree so far?
On top of being a Software Engineer at Northrop Grumman (super cool job), I am a freelance web developer working solely for makeup artists. I help out makeup artists who want to show their art and broaden their clientele by making websites that showcase their work. I think it's cool to break down the barrier between makeup and programming.

What ways can Software Engineering be used to help society?
The most beneficial ways Software Engineering is useful to society is cybersecurity and algorithms. Cybersecurity is the reason why our bank accounts aren't being hacked. And regarding algorithms, I know people that work in the medicine field. They

are coming up with intricate algorithms, programming these algorithms and hoping to create cures for diseases and even cancer.

Do you have any advice for young girls who want to be an Engineer?
Don't ever give up! This advice is coming from a girl who failed the college math placement exam and had to start at MATH11 (high school algebra) in college! It was a secret of mine that many of my college friends don't even know about. If I can do it, so can you! Don't give up! No matter where you start, you can always succeed. "Started from the bottom now we here!" (Drake)

Asian/Pacific Islander Heritage Month

May is Asian/Pacific American Heritage Month. We join in paying tribute to the generations of Asian and Pacific Islanders who have enriched America's history and are instrumental in its future success. Here are a few Asian-American women who are making a difference in engineering and technology.
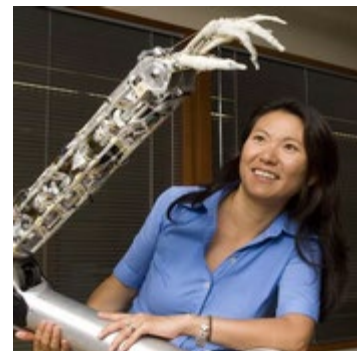
Hermie Mendoza is a Lieutenant in the United States Coast Guard. She graduated from the U.S. Coast Guard Academy in 2007 with a Bachelor of Science in Electrical Engineering. While at the Coast Guard Academy, she was on the varsity crew team and the boxing team.

She also earned a Master of Science in Electrical Engineering from Virginia Tech in 2011, a Master of Business Administration from the University of Maryland in 2014 and a Master of Information Technology from the University of Maryland in 2016. She is a member of the Institute of Electrical and Electronic Engineers.

Yoky Matsuoka is the Vice President at Google's newly formed Health Care Technology Group.

Previously, she was an Assistant Professor at Carnegie Mellon University and an Associate Professor of Computer Science and Engineering at the University of Washington. At the University of Washington, her research combined neuroscience and robotics to create more realistic prosthetics.

She is a 2007 MacArthur Fellow, commonly referred to as the Genius Award.

Reshma Saujani is the Founder and CEO of Girls Who Code, the nonprofit organization working to close the gender gap in technology while teaching girls confidence and bravery through coding.

Saujani was the first Indian American woman to run for U.S. Congress. She is the author of three books, including "Girls Who Code: Learn to Code and Change the World".

SWENext Engineering Challenge with a Chance to Win a Freebie!

Software Engineers use their knowledge of engineering principles and programming languages to develop software products, program apps for our phones and run network control systems. Their day to day activities at work can involve working on coding something or even traveling to a facility to help install a new piece of software to help run equipment for a company.

This month, we're challenging you to think like a Software Engineer by "programming" your way through a maze. To complete this activity, you'll need to **print the activity packet from this link.** You'll also need a pair of scissors and a game piece or other token to move through the maze at your command.

After you've printed everything out, follow the directions below to "code" your way through the maze:

1. Place the maze from page 5 of the printout on a flat surface (table, desk, floor, etc.).
2. Cut out the commands on page 1 through 4 of the printout.
3. Place your game token on the "Start" box.
4. Using the commands on pages 1 through 4, start to tell your token what to do. Lay out your directions in the order your token should follow them on the table. This is just like coding on a computer!
   a. Easy version: use the "go forward", "turn left" and "turn right" pieces as many times as you need to get your token through the maze.
   b. Hard version: use the "for", "while", "if" and "else if" pieces to tell your token to move with conditional commands like "for 3 steps, go forward" or "if there is a wall to my right, turn left."
5. Try the other mazes after you get through the first one! The last page is a blank worksheet, so you can design your own maze and then code your token through it.

FOR ⟨ 5 steps **Go Forward ↑**

Once you are done, send us a picture of your code for any of the mazes. We'd love to see how you do. **Email your entry to swenext@swe.org by June 5th. Each month, a lucky winner will be selected from the submissions to win a SWENext freebie.** Don't miss the chance! All it takes is a few minutes.