# Programming Talk

All of you here are the future, not just of this country, but of the world. Because it's all of you, that are going to change the world though your creativity. But with what? With technology

You may not know this, but the world is going through a technological revolution, everything around us is rapidly changing. The way we eat, the way we travel, the way we shop, what clothes we wear what music we listen to and do you know what's at the heart of it?

Programming. And It's what you will be doing over the next three days.

Welcome to the UCL Go4Code summer school.

# Programming

So what is it? What is programming? What is code?

Yes, exactly! Programming is a way in which we can give machines instructions on how to do things.

That may not mean anything to you right now. You may ask why? What's the point?

But when we let our imagination run wild. The possibilities are endless! We can diagnose and cure heart disease, improve cancer treatment, make cars that drive themselves.

Have snap-chat filters, gaming and entertainment, the news even agriculture and farming is going through a technological revolution.

We can communicate with people around the world. We've used programming to send astronauts to space, and we've used programming to allow all of us to communicate with the astronauts in space.

# Where did it all begin?

Technology and technological advancement generally depends on three core principals.

Firstly science. Science allows us to understand nature, it let's us make sense of this amazing world around us and ask questions about the fundamental forces that govern the entire universe.

Understanding how different organisms solve problems allows us to find solutions to the problems that we face in our complex societies.
Always asking why? why do things happen and staying curious about everything from light to matter to molecules to cells to bacterial allows us to unlock natures secrets.

Once we unlock these secrets, and we understand how nature behaves. We can engineer all kinds of things that nature allows!

Take for example, the simple concept of light.

Understanding light allows us to find out what the stars in the distant galaxies are made of, what the sun is made of and let's us see when big bang. The point at which the universe began.

Most of us will have seen a rainbow. Formed when white light from the sun strikes water droplets in the air and splits into it's individual colours to give us a beautiful scene in the sky. So when you take white light and split it up, you get all the colours of the rainbow.

But what happens, when you take individual colours, like red green and blue and mix them together. You get different colours of light!

And knowing this allows us to recreate it.

I'm going to make a colour by mixing a bit of red light, a bit of blue light and a bit of green light.

This little computer is called a Raspberry Pi and on top of this, we've attached a device called a Sense HAT which has these little LED lights. Each LED light gives off red, green and blue light. And I'm going to use this to show you

Now, in my I'm going to put 60% red light 40% green light and 70% blue light in my colour and I'll set all the lights to do this.

There we go, we have a completely different colour of light that we made from just mixing red green and blue light.

We knew how to do this, because we understand how light interacts and were able to engineer and recreate that interaction.

So science let's us understand the secrets of nature, engineering let's recreate elements of nature through machines and devices. And programming, well programming let's us manipulate our creations!

It's how we create, innovate and develop technology. By getting machines to do things that we thought were unimaginable.

Because "Nothing is too wonderful to be true, if nature allows it"

Over the next three days, we'll be showing you how to program a Raspberry Pi and a Sense HAT in the python programming language so that you can get creative and make your very own games and projects.