Let's Talk About Programs

Where are computer programs used?

Call out a place that you can think of where computer programs are used!

Where are computer programs used?

Everywhere!

Computer programs are essential for life as we know it to operate as it curently does!

What do programs **do**, though?

At a very basic level, programs just implement **algorithms**.

An **algorithm** is a self-contained, step-by-step set of instructions used to solve a problem.

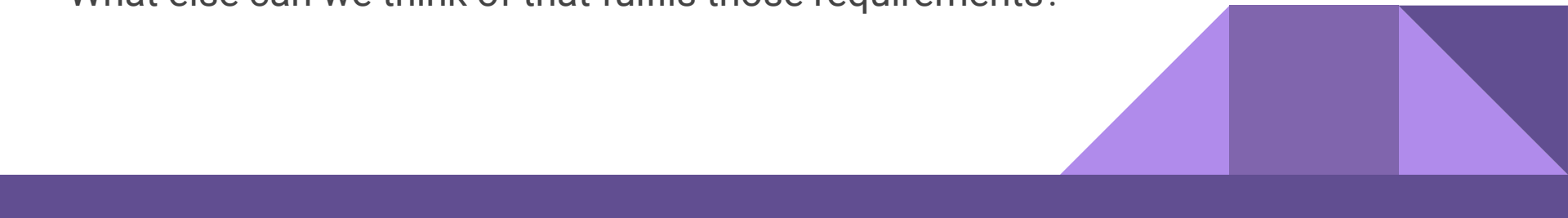
What kinds of things qualify as algorithms?

Let's name some different things that could qualify as an algorithm!

For example:

A recipe in cooking counts as an algorithm, because it is self-contained, and it includes the step-by-step instructions to create the meal/dish!

What else can we think of that fulfils those requirements?



Algorithm Example

The Hokey Pokey!

You put your right hand in!

You put your right hand out!

You put your right hand in, and you shake it all about!

etc.

Algorithms and Programs

Like I said before, programs **implement** algorithms.

This means that a program takes the step-by-step instructions of an algorithm, then tells the computer how to actually execute those steps!

Computer Algorithms for EVERYTHING

- Sorting the songs that you have in your music library
- Suggesting videos to you on YouTube
- Finding the best results for your question in a search engine
- Facial or speech recognition
- Playing a video on your computer screen
- Sending audio to the speakers of your computer

Algorithms for Everything

A lot of the time, we **reuse** existing algorithms when we create new ones in our computer programs.

Combining existing algorithms to create a new one helps us ensure that the new one will be correct - if all the building blocks work well, the entire structure should as well!

Different Development Cycles

Programs are both developed and used in a variety of different ways, depending on the goals of the programmer.

For example, a program that is intended only for use one time by one person will be developed very differently from a program intended to be used for a long time by a large number of people.

Motivations Behind Programming

There's a vast number of different reasons that people write computer programs. Here's a few common reasons why people do so:

- To express creativity
  - Programs to create art or music, for example
- To satisfy personal curiosity
  - Testing one's skills and abilities, or learning a new skill
- To create new knowledge
  - Processing data to form new understandings of the world around us
- To satisfy a common need
  - Google, Amazon, Netflix, etc.

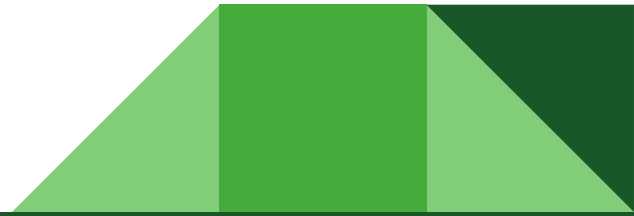
Sharing Programs

A computer program (or the results of running one) can often be shared to a large number of users, especially in the digital age we live in now!

This can have a huge impact on people, organizations, and society as a whole!

As an example, Tesla spent a long time developing software that enables their cars to drive themselves.

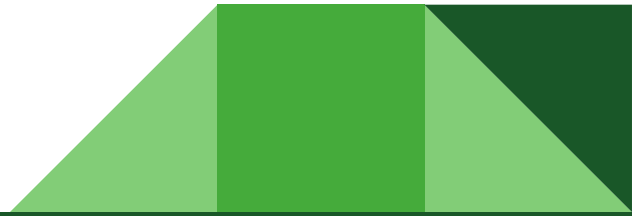
They pushed an update to every single car overnight, and the next morning all Tesla vehicles were able to drive on autopilot!



Influencing Other Fields

Advances in computing have generated and increased creativity in a variety of other fields!

- Music
  - Electronic Music
  - Digital effects added to traditional music
  - Music visualizers
  - Sharing music digitally
- Science
  - Data collection and analysis
  - Improved calculation ability



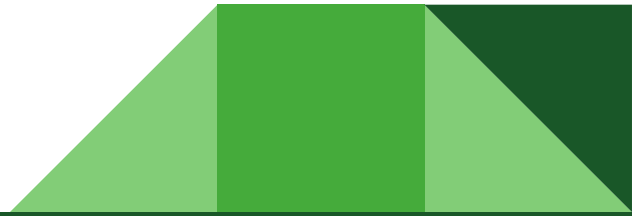
Where can we find computers?

Modern computing devices

- Desktops
- Laptops
- Tablets

Other Computers

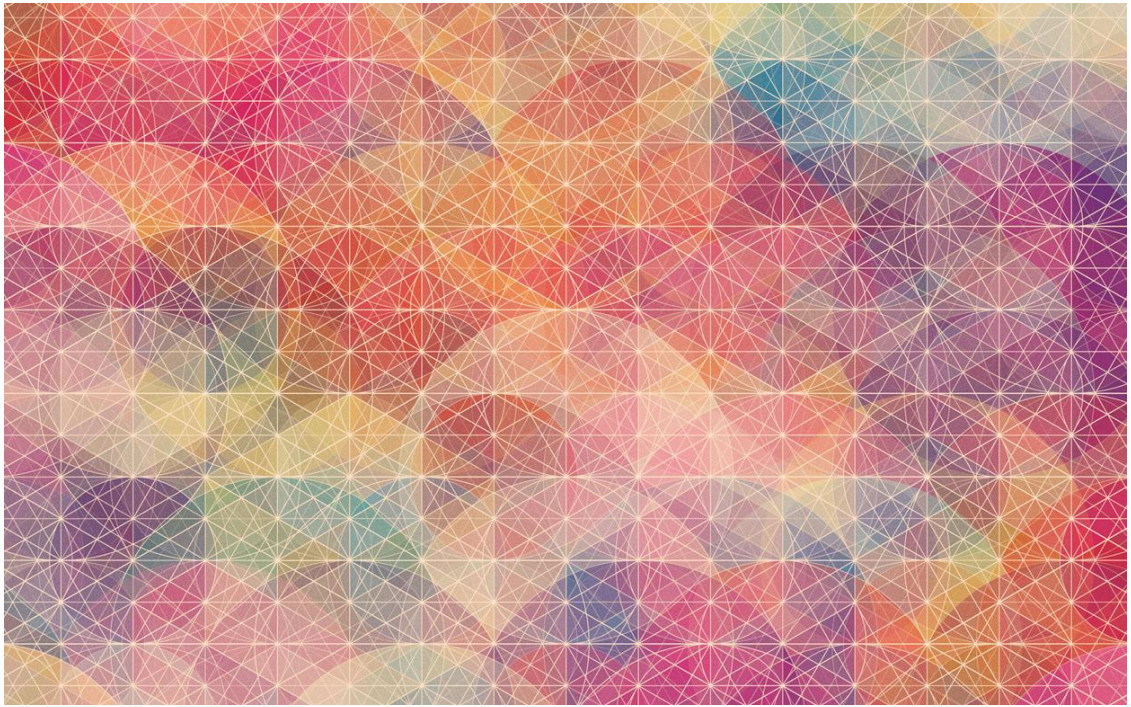
- Smartphones
- Smart Watches
- Toys
- Cars
- Appliances



Some Other Applications of Computers

- Auto-pilot
  - Airplanes
  - Cars
- Medical Devices
  - Defibrillators
  - Pacemakers

Art



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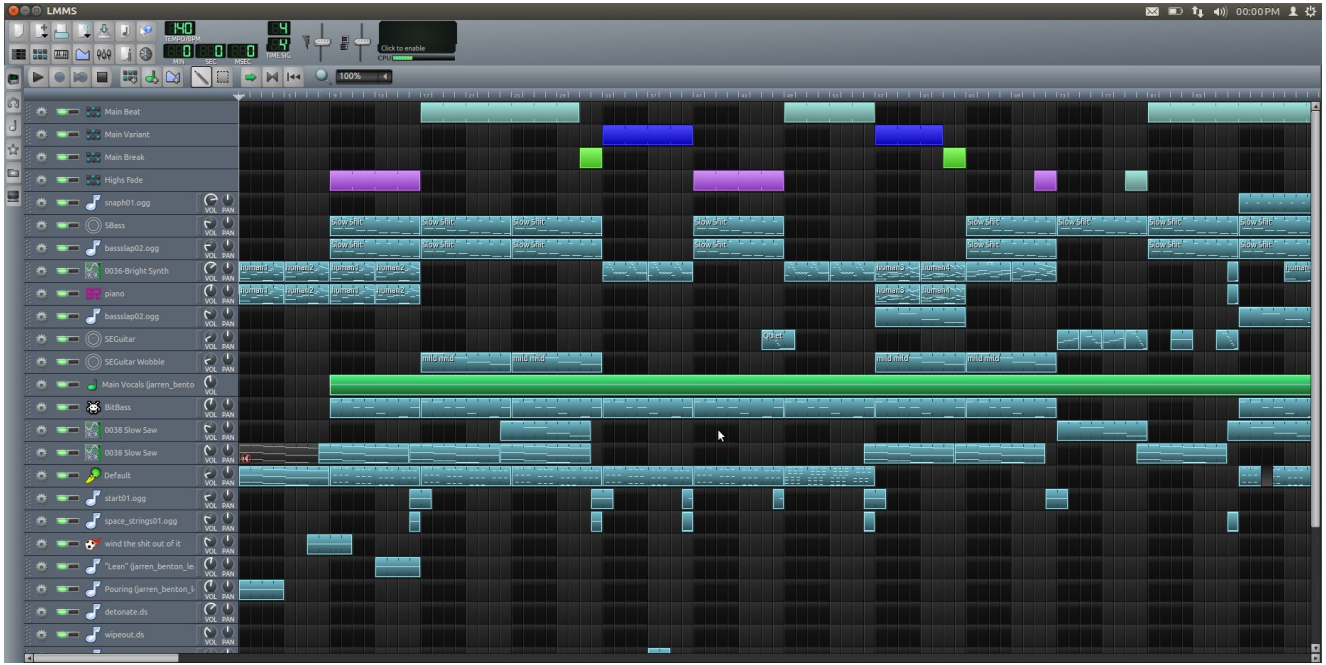
Music



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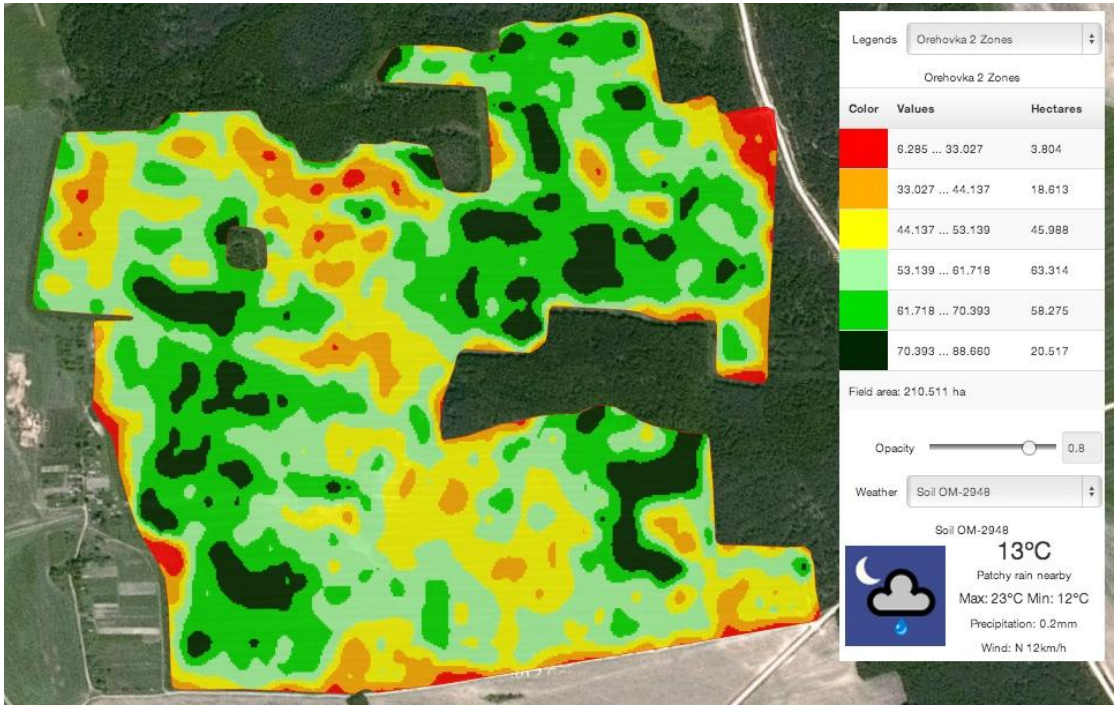
Agriculture



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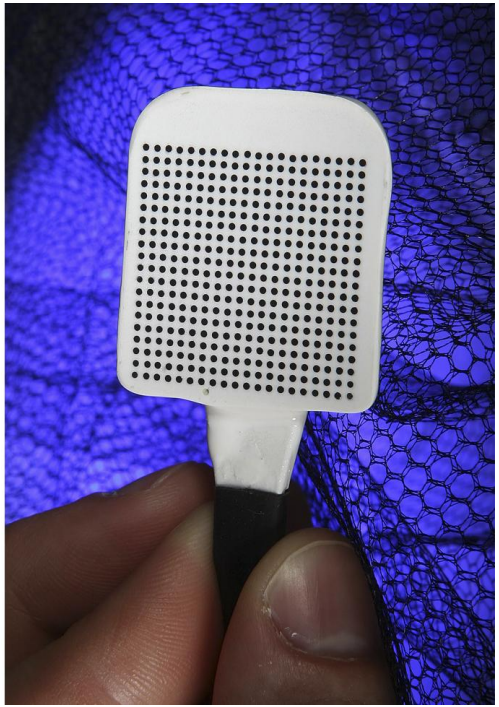
Health and Medicine



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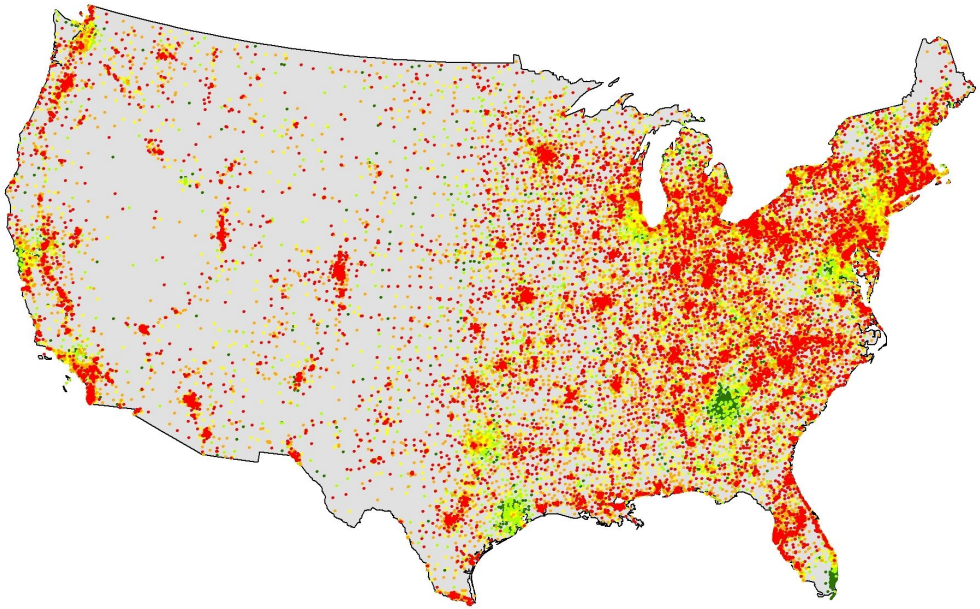
Health and Medicine



Illness Prevalence (%): 0.01 - 1.00 1.01 - 2.00 2.01 - 3.00 3.01 - 4.00 4.01 - 5.00

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Communication

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