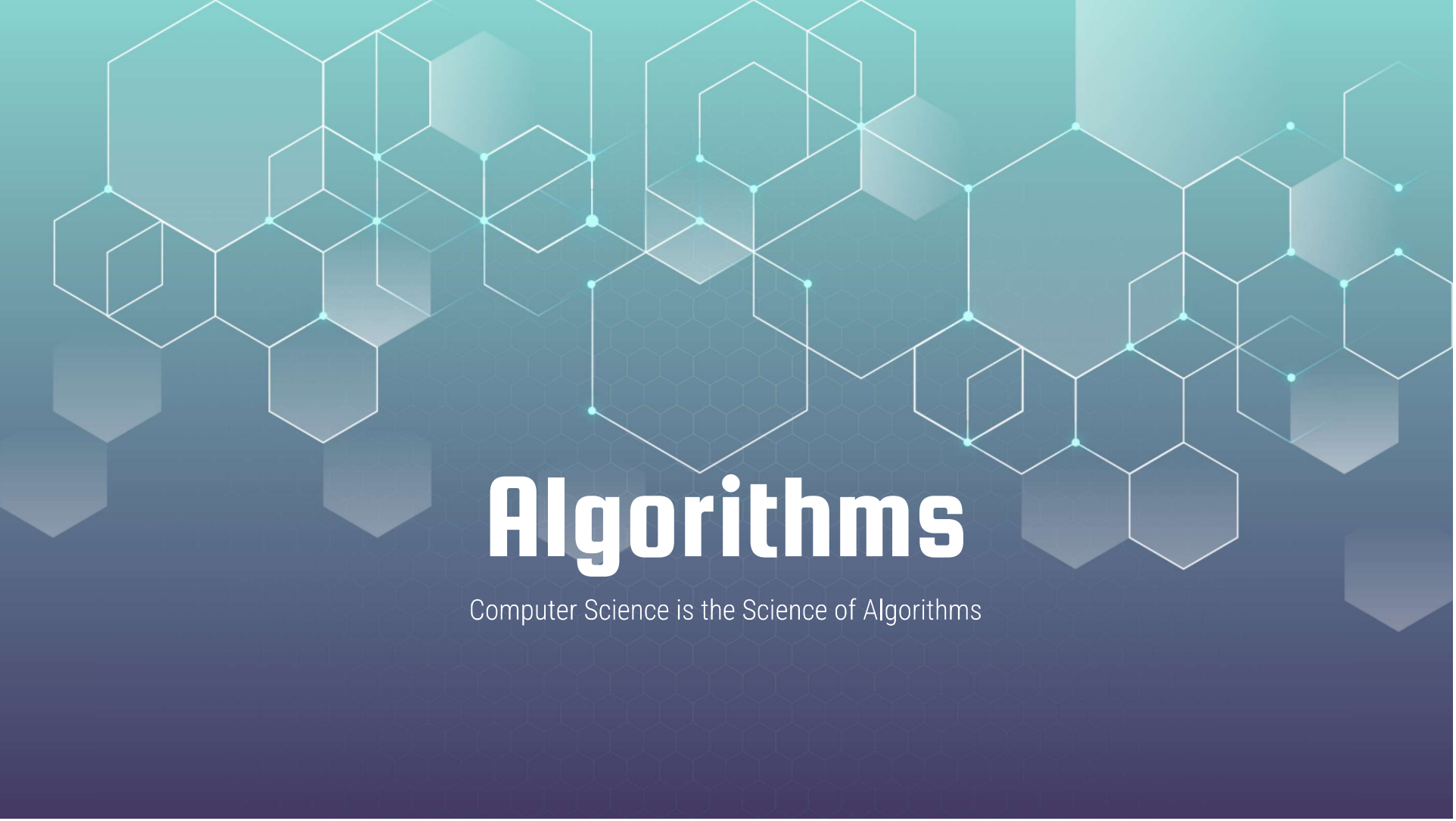

Algorithms
Computer Science is the Science of Algorithms

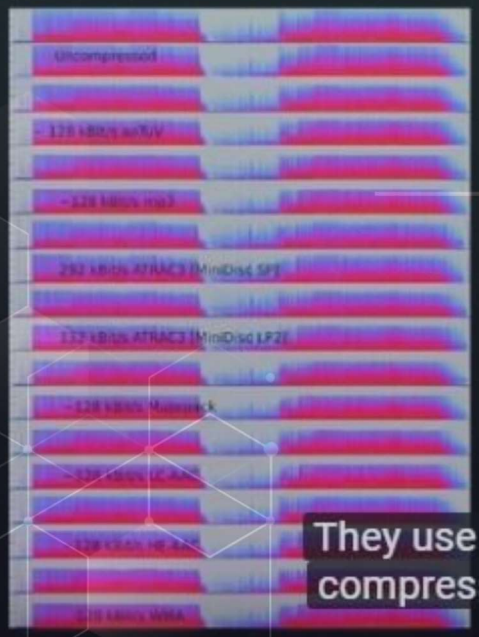
Algorithm

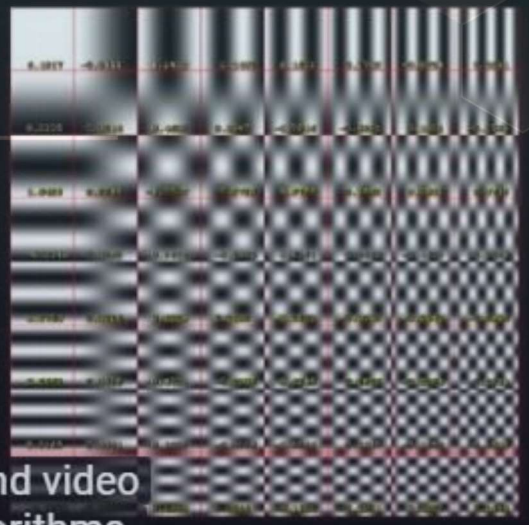
A set of steps to accomplish a task.

An algorithm is an ordered set of unambiguous, executable steps that defines a terminating process.

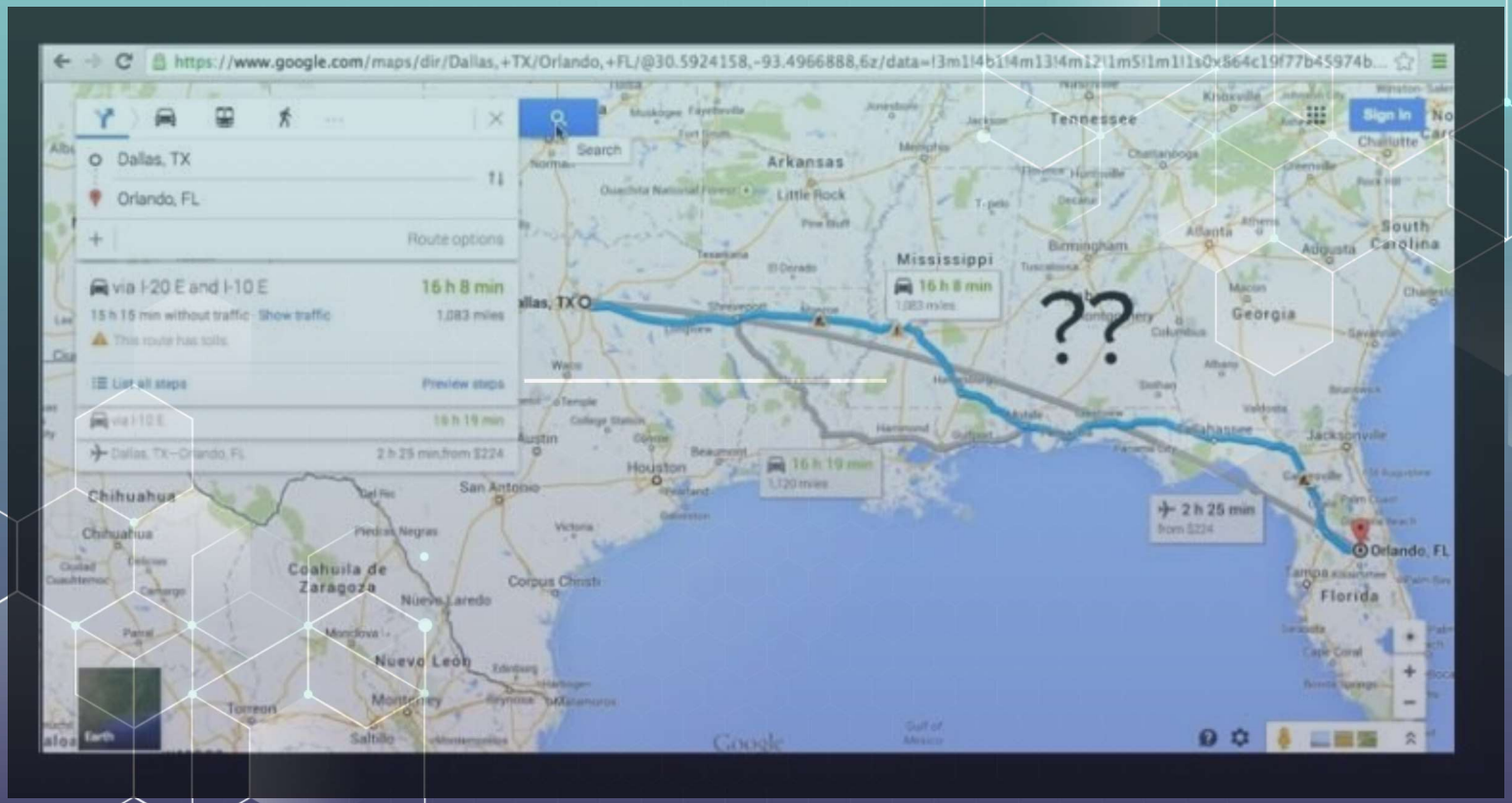

How does Google Hangouts
transmit live video

Compression algorithms





They use audio and video
compression algorithms.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Search
Sign in
Dallas, TX
Orlando, FL
Route options
via I-20 E and I-10 E
16 h 8 min
15 h 15 min without traffic · Show traffic
1,083 miles
This route has tolls.
List all steps
Preview steps
16 h 19 min
Dallas, TX–Orlando, FL
2 h 25 min from $224
Tennessee
Arkansas
Little Rock
Mississippi
Birmingham
Atlanta
Georgia
South Carolina
Augusta
Jacksonville
Houston
Austin
San Antonio
Corpus Christi
Chihuahua
Coahuila de Zaragoza
Nuevo Laredo
Nuevo León
Monterrey
Torreón
Saltillo
Florida
Orlando, FL
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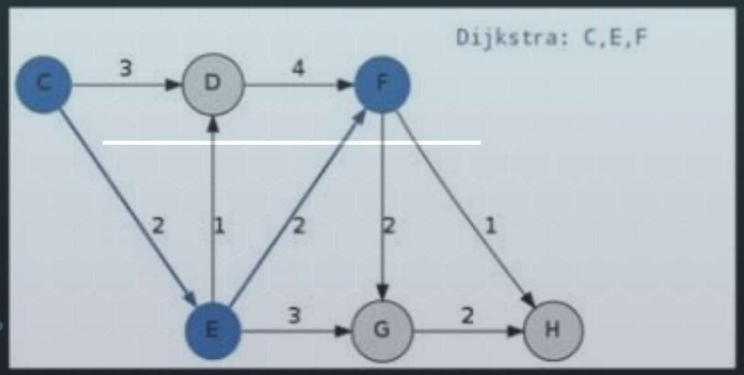
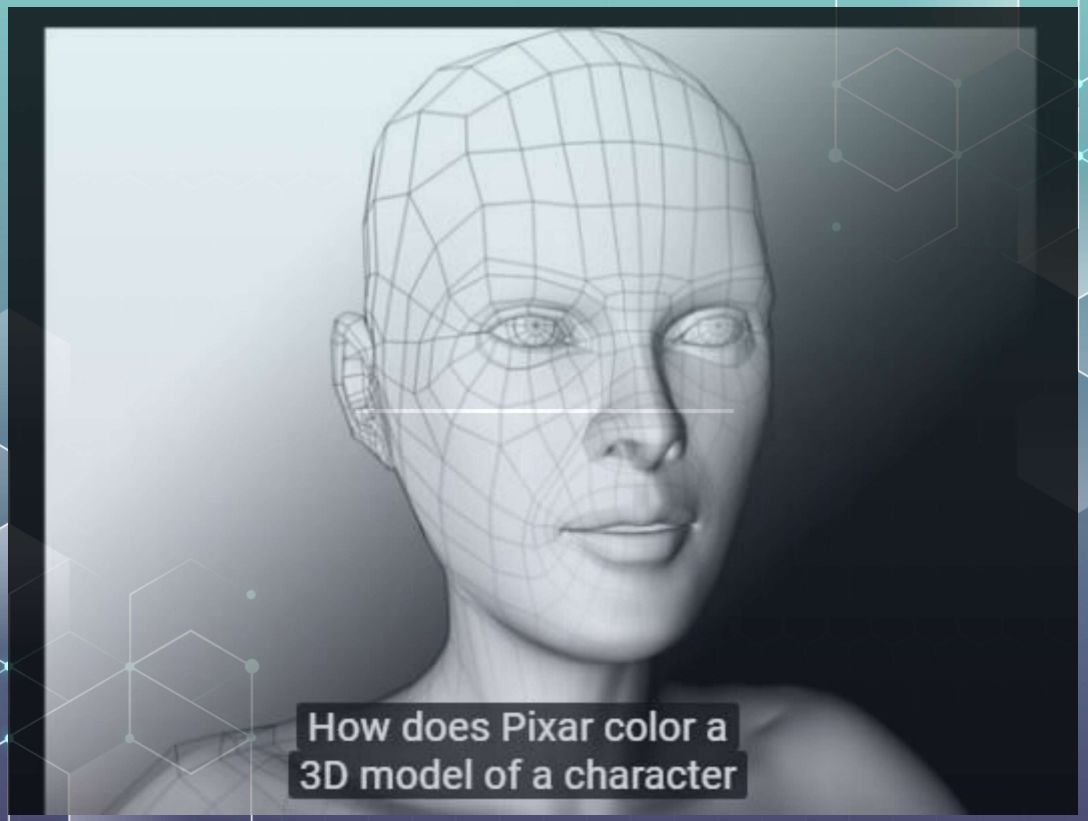
Earth
Google

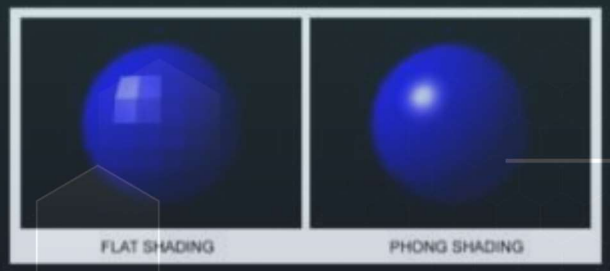
Route finding Algorithms

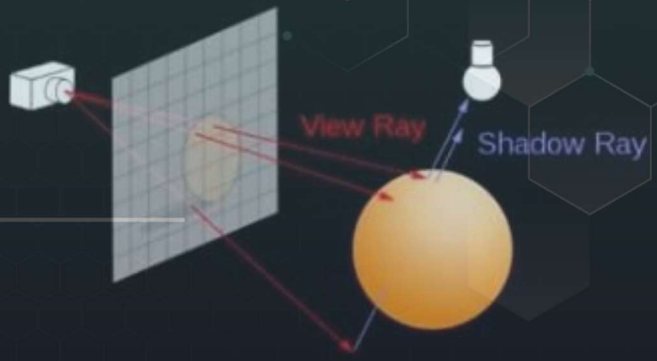


They use a route finding algorithm.

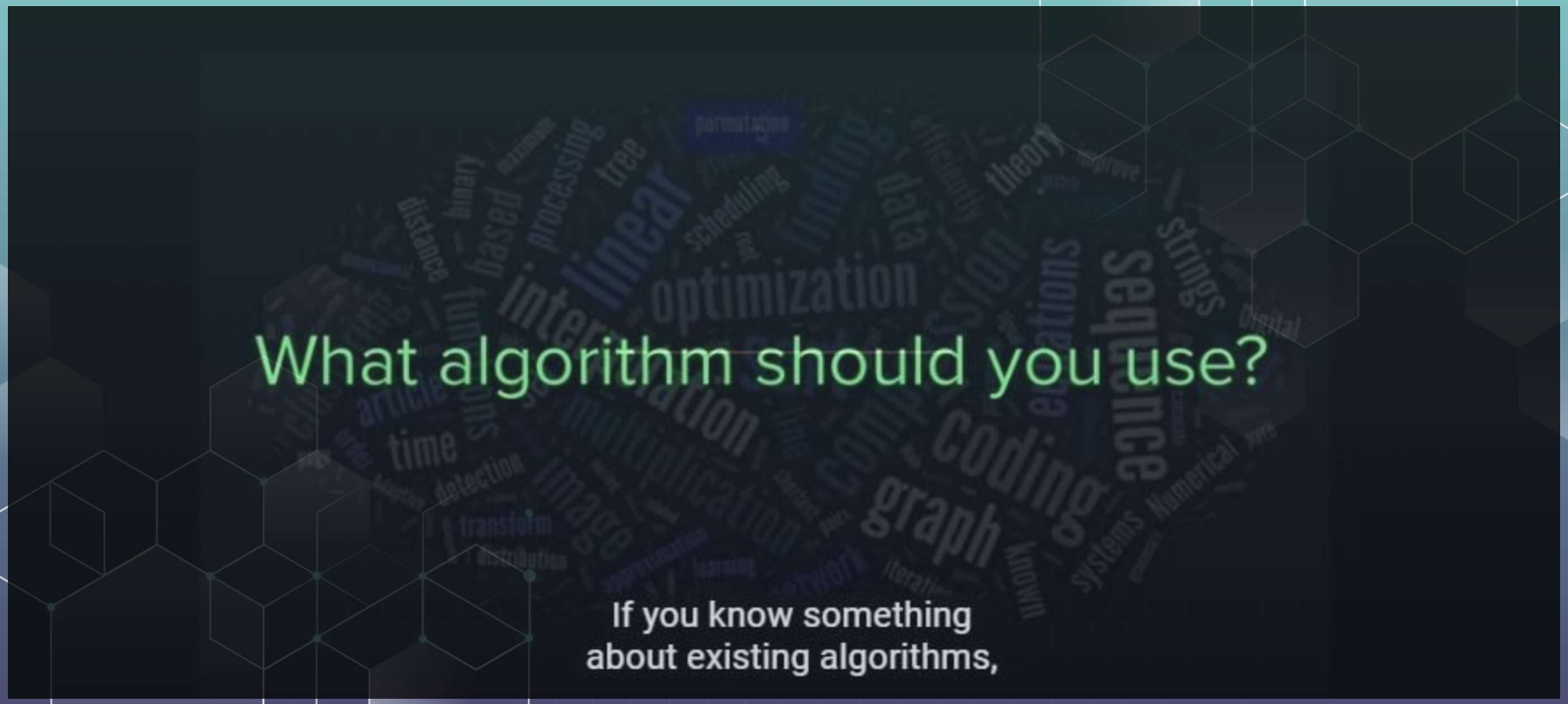

How does Pixar color a
3D model of a character

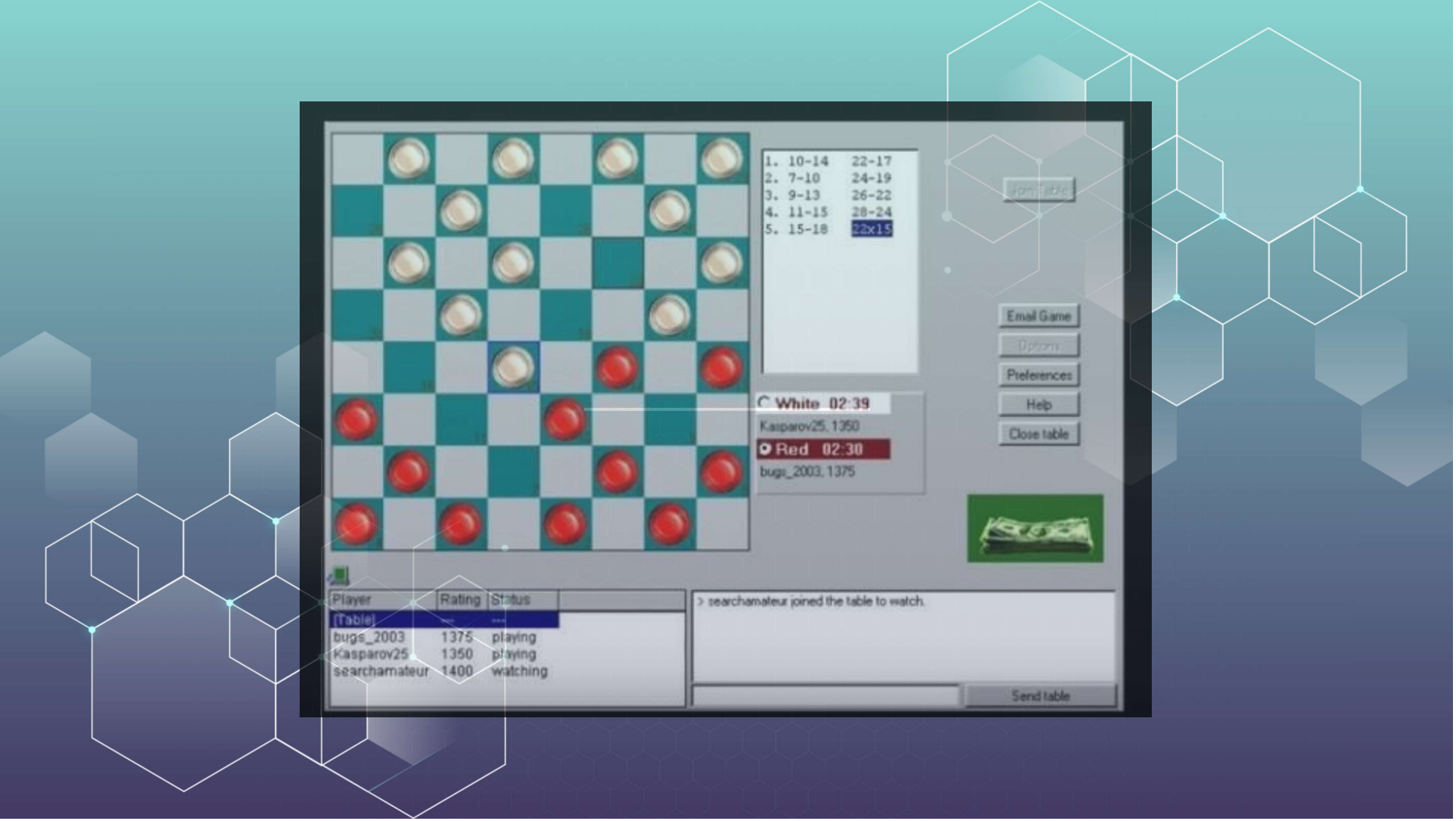
Rendering Algorithms



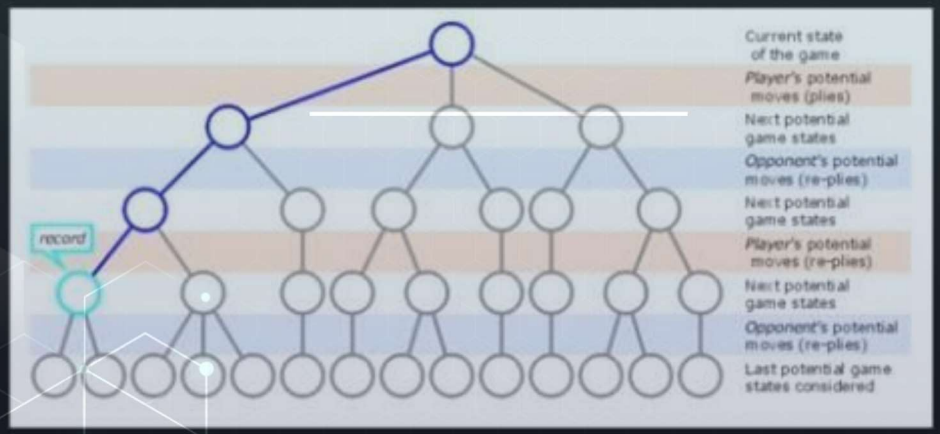


They use a rendering algorithm.


What algorithm should you use?
If you know something
about existing algorithms,


1. 10-14 22-17
2. 7-10 24-19
3. 9-13 26-22
4. 11-15 28-24
5. 15-18 32x15
Email Game
Options
Preferences
Help
Close table
White 02:39
Kasparov25, 1350
Red 02:30
bugs_2003, 1375
Player
Rating
Status
[Table]
bugs_2003 1375 playing
Kasparov25 1350 playing
searchamateur 1400 watching
> searchamateur joined the table to watch.
Send table

Minimax algorithms

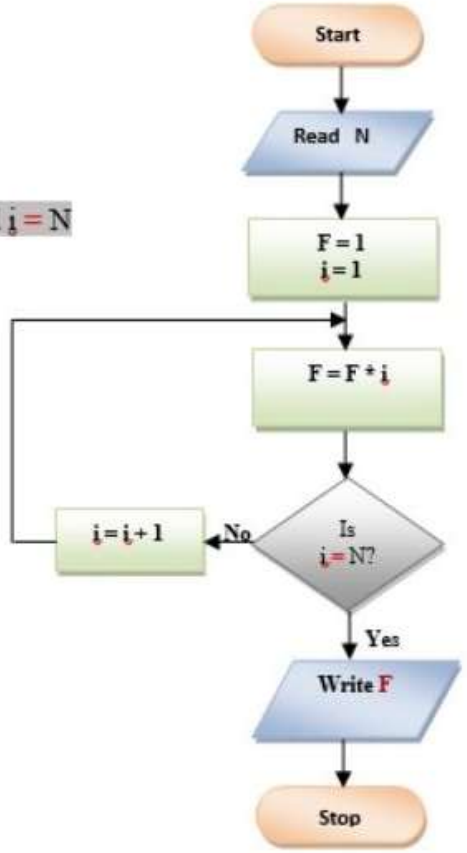


Draw a flowchart for computing factorial N, where N! = 1 * 2 * 3 * ..... N

Algorithm

1. Start
2. Read N
3. Initialize F =1, i = 1
4. F = F * i
5. Increment i by 1
6. Repeat step 4 & 5 until i = N
7. Print F
8. Stop

Flowchart



Program

```c
#include<stdio.h>

int main()
{
    int N, F = 1, i;

    printf("Enter value of N: ");
    scanf("%d", &N);

    for(i=1; i<=N;i++)
    {
        F = F * i;
    }

    printf("Factorial of N is: %d", F);

    return 0;
}
```

1. Variables

A variable is a symbolic name or reference to some kind of information. This is similar to how the term is used in math. For example, if you're using positive integers, then a + b > a. In this scenario, a and b are both variables. In computer programming, variables allow code to operate for any values being represented by variables, but they can be more than just symbolic letters. Variables can have a number of properties, such as name, type, value, scope, life time, or location (in a computer's memory). Different languages call for variables differently, but they all use the component. You can find more examples here.

2. Conditional statements (“if” statements)

Conditional statements are expressions that ask the program to determine if a variable is true or false (pro tip: these are known as Boolean values). Typically, if a statement is true, the program should perform one action, and if a statement is false, the program should perform a different action. Those actions are called conditions. Read on here and here.

3. Looping and iteration

An iteration is any time a program repeats a process or sequence. Loops are a common type of iteration, in which a program performs a certain action for an indefinite number of times until a new condition is met. These are frequently called "while loops," because they often express that "while" a certain condition is true, the program should continue to do a certain action until that condition is false or a new condition is true. Loops also make it possible for programs to do something else while a given process is running.

4. Data types and data structures

Data types help classify what information a variable can hold and what can be done with it. Data types include:

- Numbers, (e.g., 7, 3.14).
- Booleans (true or false)
- Characters ('a', 'b', … 'z', '1', '2', … '9', '!', '^', etc)
- Strings (multiple characters strung together — eg. "hello world!")

Data Structures Include:

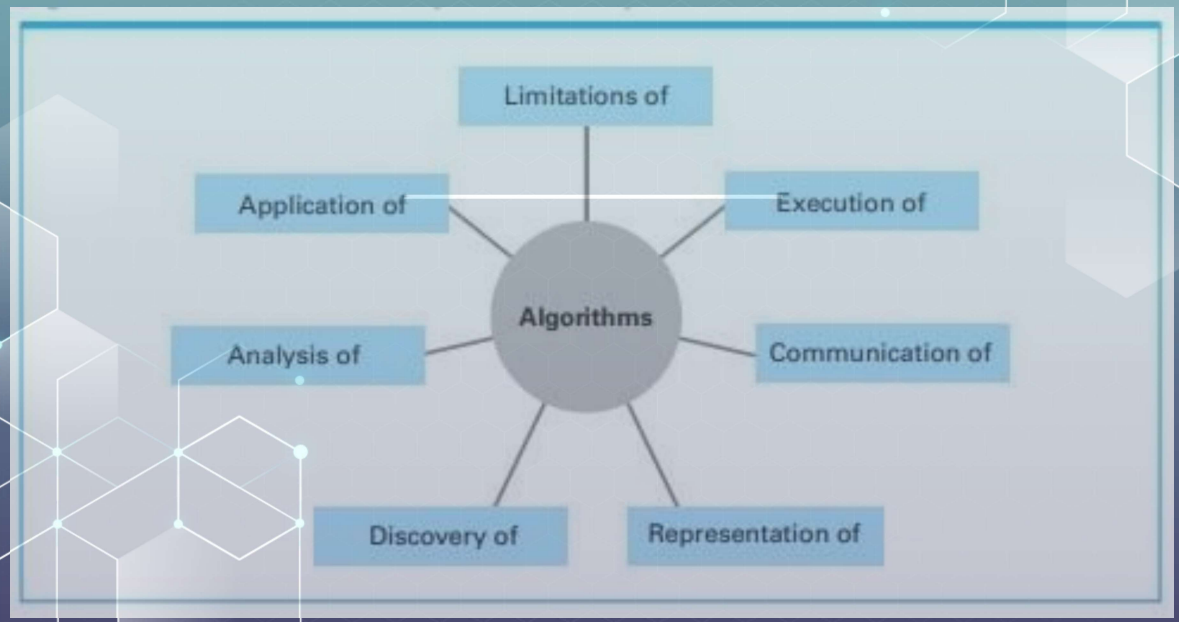
- Arrays/Lists (an ordered list of multiple items.)
- Hashes/Dictionaries (an unordered list of key-value pairs)
- Objects (a data structure that encapsulates information and functionality)

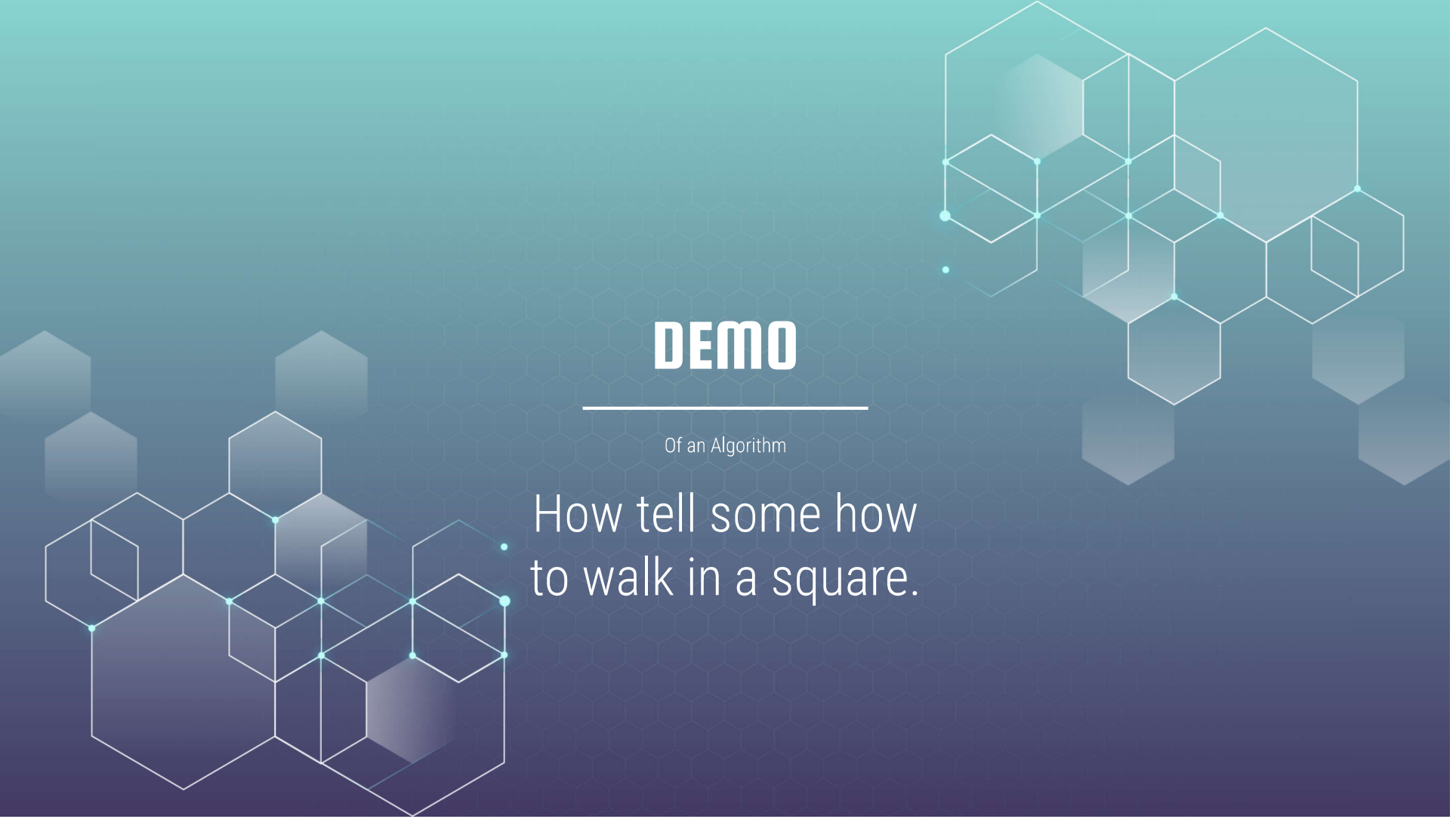
5. Functions

Functions are self-contained modules of code that accomplish a particular task. Once a function is written, it can be called and used repeatedly. They operate like a black box: data goes in, the function operates on it, and processed data comes out. Functions let you reuse code rather than constantly rewrite it, and allow you to think about your program as a series of sub-steps. Functions are also known as routines or subroutines.

Recognizing these five components of a computer language will help you situate yourself when learning a new language. You'll be able to pick up new languages faster, and understand how to manipulate different languages to best produce your program.

What is Computer Science?




DEMO
Of an Algorithm
How tell some how
to walk in a square.


THANKS

CREDITS

- khanacademy.org
- Computer Science an Overview
- https://www.lexico.com/en/definition/algorithm