

Application Development

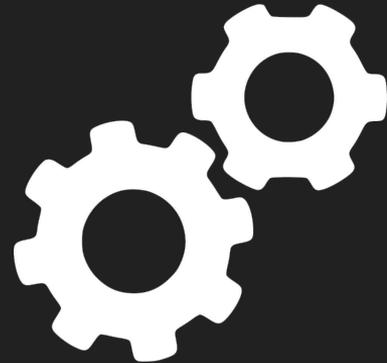
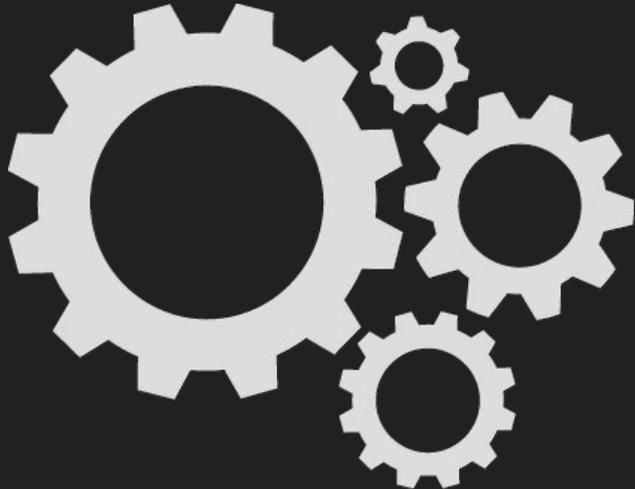
```
void main() {  
    procrastinate();  
    startPresentation();  
    answerQuestions();  
    cullPeanutGallery();  
    killTime();  
    exit();  
}
```

What is Application Development?

Definition: Process of creating a software application that performs a task.

Types: Desktop, Mobile, Tablet, Web, Cloud, Database

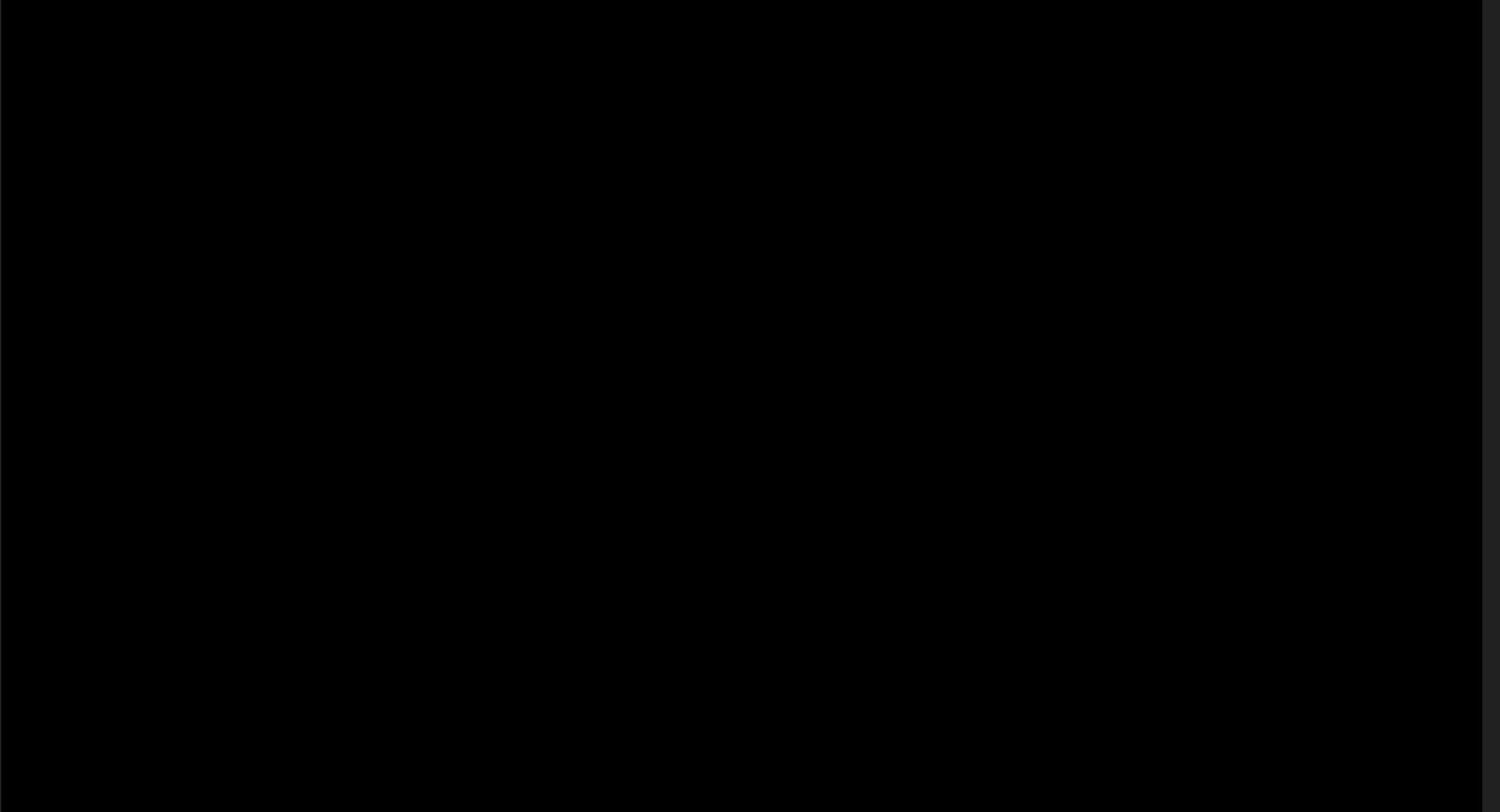
OS Platforms: Microsoft Windows, Apple OSX, iOS, Android, Linux



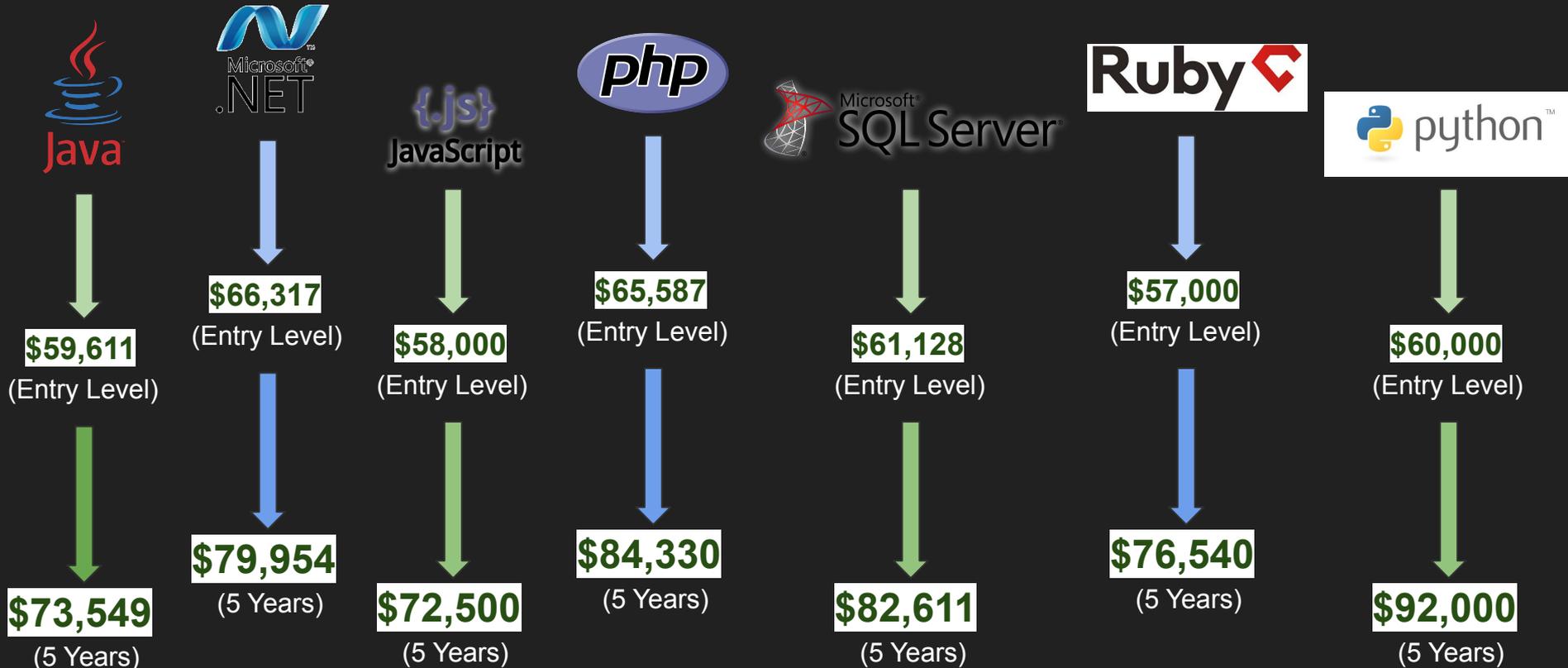
Why be interested in Application Design/Development?

- The future is dependant on Information Technology (77 billion dollar industry).
- US Bureau of Labor Statistics has estimated that by 2020, there will be 1,000,000 more computing jobs than applicants who can fill them. IT is a highly lucrative field, and a great investment for the future.
- Become a part of the future, as many IT fields are working with state-of-the-art software, artificial intelligence, advanced robotics and more.
- Application design/dev allows for a lot of creativity, not just in designing interfaces. There are tons of ways to achieve the same result, using different methodologies and finding more efficient ways to reduce lines of code can become an art.

Amazon Warehouse Updated



Average Developer Salaries (US)

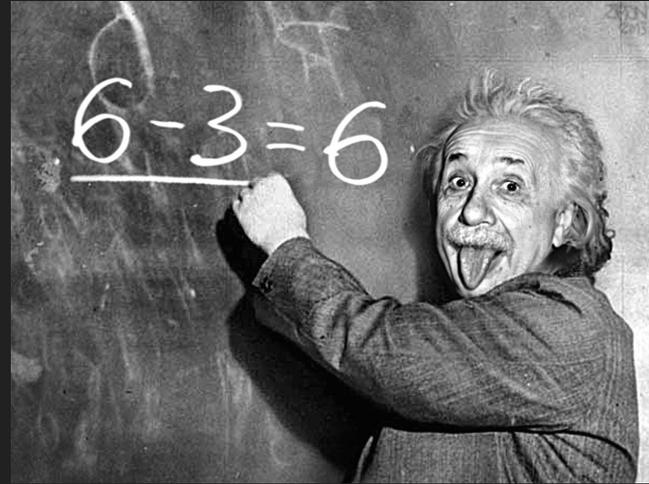


Creativity, Imagination & Drive

“Imagination is more important than knowledge” - Albert Einstein

You don't need to be a computer expert, a mathematician, or a huge nerd to thrive in the field of IT.

There are many different ways to solve a problem, and bringing a different point of view is crucial in solving complex problems, refactoring code, and creating more effective solutions.



Application Development Stack

Front-End (Client-Side): Everything the user sees and interacts with on screen (interface). Front-End communicates back and forth using requests with the Back-End to process information.

Interface: Visual representation of an application. Primarily the controls.

Back-End (Server-Side): Program logic that runs behind the scenes, triggered by the Front-End to perform tasks.

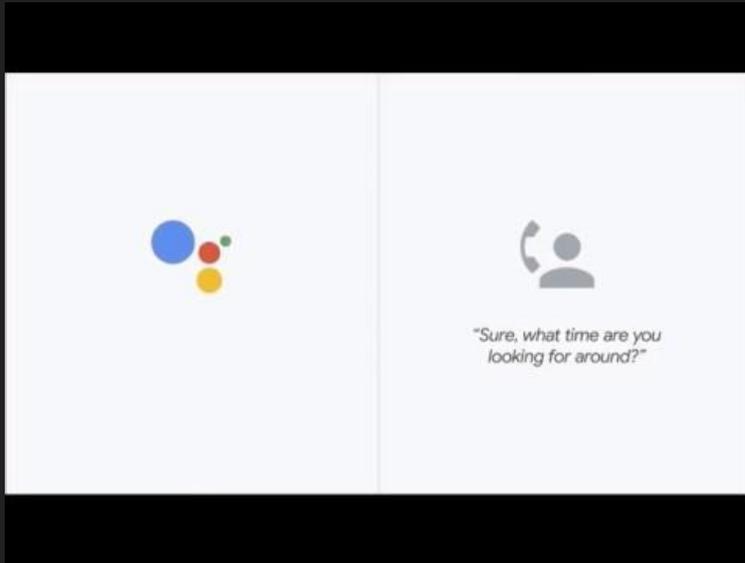
Database: Storage of information that the back-end communicates with to process/store data. User accounts, program data, files, etc.



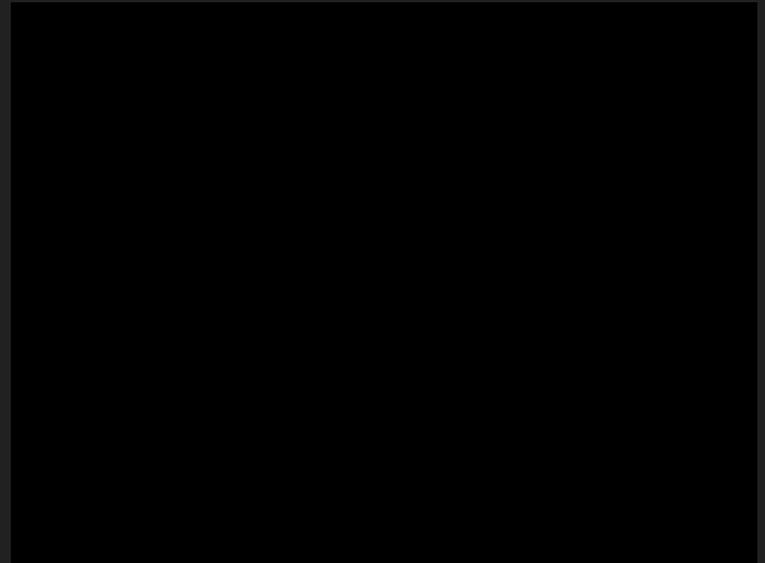
Consumer Grade Artificial Intelligence

Voice activated, virtual assistant appliances are used for music playback, making to-do lists, setting alarms, playing audio books, and several other functions.

Google Assistant (Google Home)



Amazon Alexa (Echo)

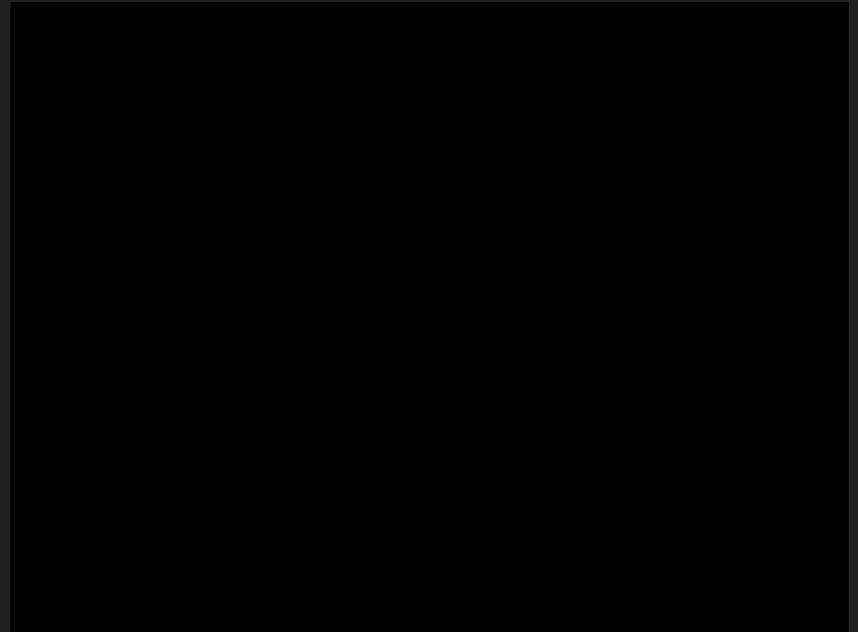


Advanced Robotics

Boston Dynamics is an American engineering and robotics design company founded in 1992 and headquartered in Waltham, Massachusetts, that specializes in the research and design of advanced robotics.

The company is best known for the development of BigDog, a quadruped robot designed for the U.S. military with funding from Defense Advanced Research Projects Agency (DARPA).

On 13 December 2013, the company was acquired by Google.



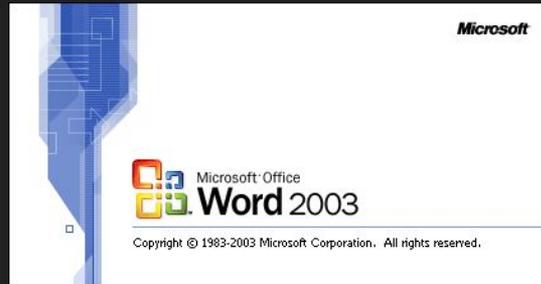
Standard Desktop Application

- Self contained application that has front-end/back-end built into itself.
- Does not require an internet connection.
- Runs locally on users' machine

Single Player Games



Standard Desktop Applications



Client-Side Application

Application that is broken into two parts, the client-side and server-side. Client-Side part of application is ran locally on users' computer and communicates back and forth between the Server-Side.

- Front-End (user interface) is displayed locally on users' device.
- Requires internet connection to work properly, as only part of the application is exists on users' computer.

Websites with authentication



Multiplayer Games



Online Applications



Server-Side Application

Back-End portion of application that does computations, fetched data and communicates back to client application.

- Does the behind-the-scenes work to deliver client-side application with validation, data, and resources, which leads to improved security over a traditional desktop application.
- More applications are becoming reliant on servers to run the bulk of application, so the user doesn't require a powerful computer to run an advanced application.

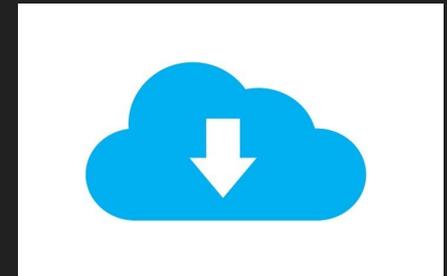
Cloud Processing



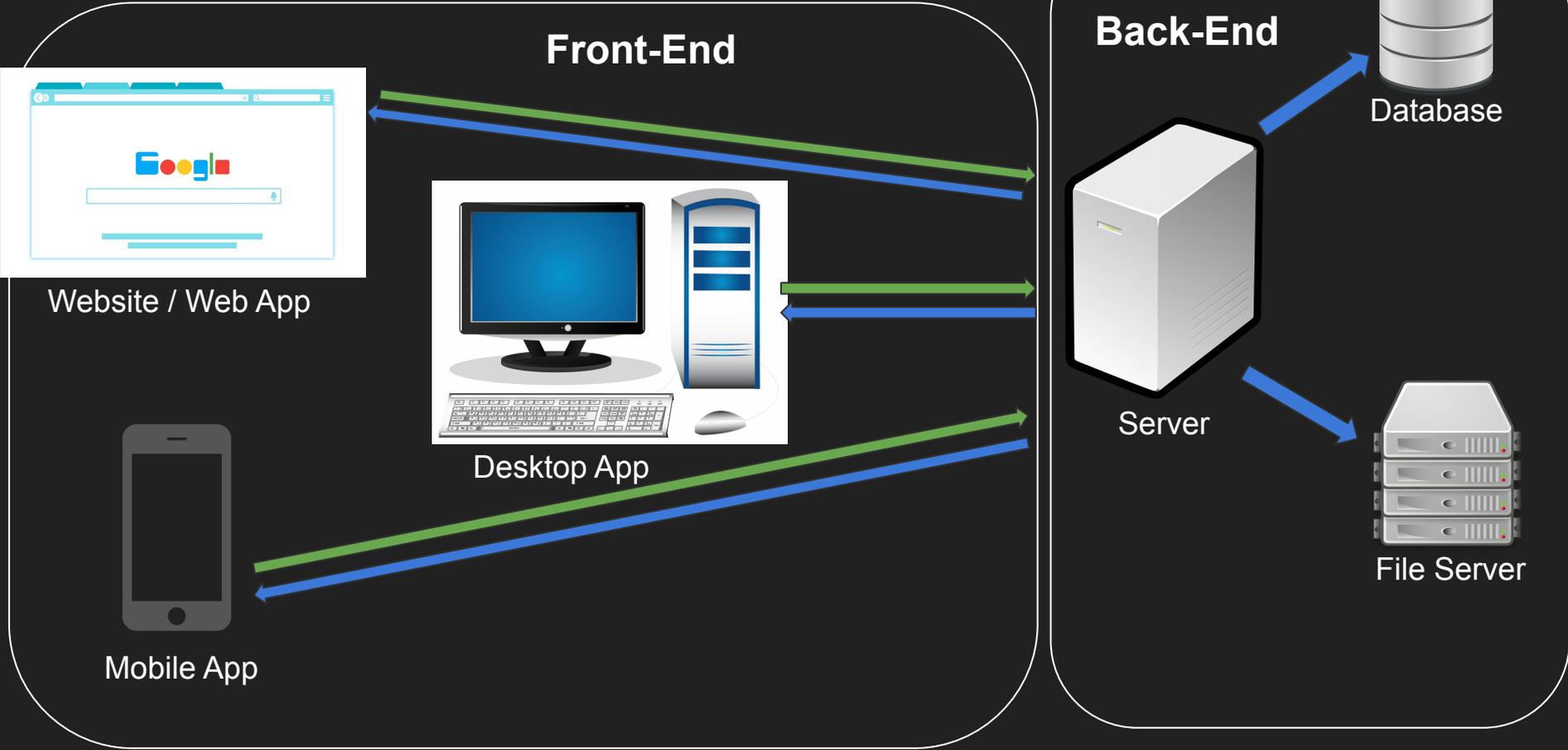
Multiplayer Servers



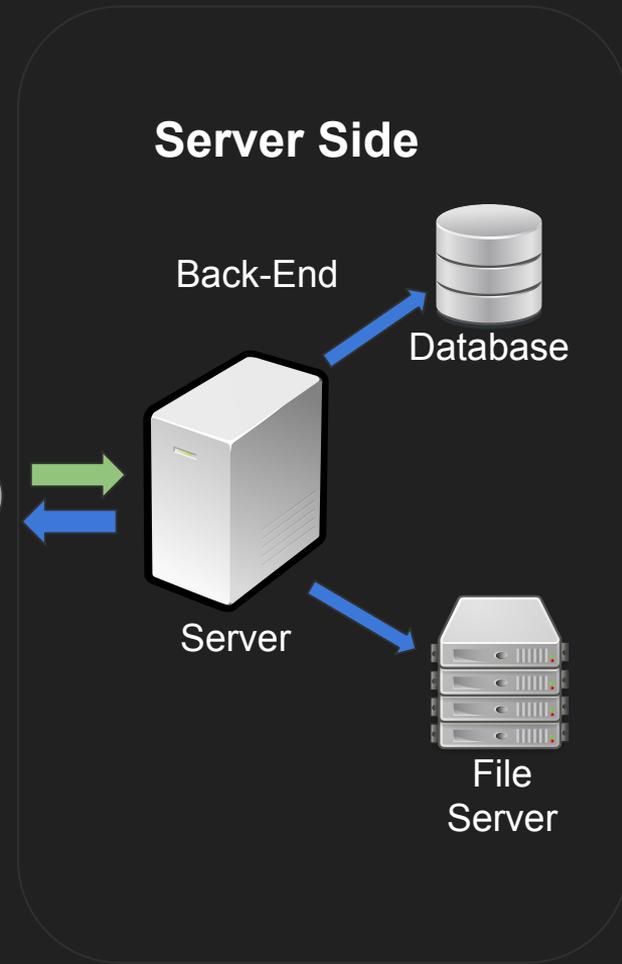
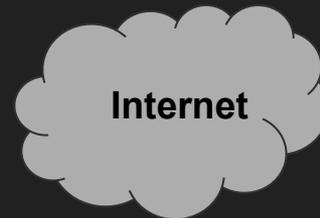
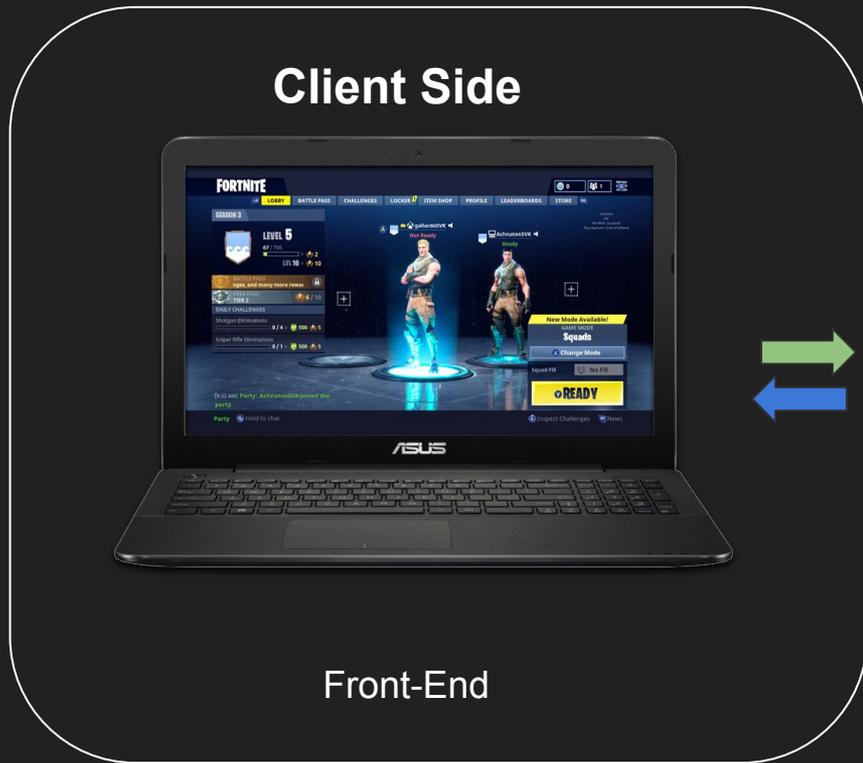
Online Storage



Front-End / Back-End Road Map



Client-Side / Server-Side Road Map



Questions? Comments? Concerns?



Quiz #1 - Application Development

<http://apps.palmbeachschools.org/PocketQuiz/Home>

albert.einstein@palmbeachschools.org

Password: Manhattan46

Web Design & Development

```
<html>  
<head>  
<title>  
My Awesome Website  
</title>  
</head>  
<body>
```

What is Web Design?

Process of creating the design portion of a website. Interface design, graphic design, usability design, accessibility design. (Create the look and feel of website).

- HTML
- CSS
- Graphic Files (jpg, gif, png)
Please don't use bitmaps!



What is Web Development?

Process of creating the functionality of a website.

Scripting code for website functionality (javascript, php, etc).

Front-End Dev (wiring up interface controls to communicate with back-end).

Back-End Dev (creating server-side application to deliver data).

Parts of Website (DOM)

The DOM (Document Object Model) is the interface that makes up a website. The browser reads in HTML and builds a visual representation on your screen.

Example: ``

Browser renders:



Example: `Click here to get to Google`

Browser renders: [Click here to get to Google](https://www.google.com)

Image Formats in Web Design

- Jpeg: Most common image format. High quality/compression. Does not support transparency.
- Gif: Supports transparency & animation, but lacks the quality of jpeg/png.
- PNG: High quality image format. Larger size than jpeg. Supports transparency.
- Bitmap: Do not use a bitmap in web design! Huge filesize and no benefit!



HTML5: What it be?

Hypertext Markup Language - Version 5

Standard scripting language for tagging text files to achieve web formatting effects, such as font, color, graphic and hyperlink effects on a website. It's also cross-platform and royalty free!

What's new in version 5?

HTML5 can now do animation, play embedded videos and create web applications that prior to it's release, required browser plugins such as Flash and Shockwave to perform.

Websites using HTML5

<https://www.ringba.com/white-label/>

<https://lusion.co/>

<https://www.dodge.com.mx/muscle>

HTML Example

File Edit View Help

```
<HTML>
  <HEAD>
    <TITLE> Plant-o-matic Web Page </TITLE>
  </HEAD>
  <BODY bgcolor="yellow"      <!-- background color - add to BODY tag -->
    <!-- examples of headings -->
    <h1> Plant-o-matic </h1>
    <h3 align="right"> New Automatic Plant Feeding and Watering System </h3>
    <!-- examples of font tags -->
    <p><font color="green" face="Comic Sans MS" size="2">
      Be the first in your neighborhood to own the          Plant-o-matic</font></p>
    <p align="center"><font color="#00FFFF" face="arial" size="5"> Don't Wait!!</font>
    <!-- horizontal rule or line -->
    <hr color="purple"> </p>
    <!-- bold, underline, italics and paragraph vs break tags -->
    This new <b>product</b> will save you <u>time</u>, <p>
    <em>money</em>, <br>
    and will keep your plants <i>alive</i>.          <!-- more italics -->
    <p>
    <!-- link example - site on the internet -->
    <a href="http://www.google.com">GOOGLE it yourself! </a>
    <p>
    <!-- link example - email -->
    <a href="mailto:ism3011@coba.usf.edu">or email for a testimonial.</a>
    <p>
    <!-- link example - web page in your folder -->
    <a href="example2.html"> also see our Tree-o-matic product </a>
    <p>
    <!-- unordered list example -->
    Recommended by:
    <ul>
    <li>Nursery owners across the country</li>
    <li>Homeowners</li>
    </ul>
  </BODY>
</HTML>
```



CSS

Cascading Style Sheets

Simple style definitions for HTML elements. Saves redundant work by definition styles for select elements, and being able to apply them on an entire website.

Stay organized and quickly change the look of a website without having to change all the pages individually.

CSS Example

Turn this

```
<style>
  .component-title {}
  .component-title--active {}
</style>

<h1 class="component-title component-title--active">title</h1>
```

Into this

```
<style>
  .fdf2 {}
  ._58e4 {}
</style>

<h1 class="fdf2 _58e4">title</h1>
```

No Style

Welcome to My Homepage

Use the menu to select different Stylesheets

- [Stylesheet 1](#)
- [Stylesheet 2](#)
- [Stylesheet 3](#)
- [Stylesheet 4](#)
- [No Stylesheet](#)

Same Page Different Stylesheets

This is a demonstration of how different stylesheets can change the layout of your HTML page. You can change the layout of this page by selecting different stylesheets in the menu, or by selecting one of the following links:

[Stylesheet1](#), [Stylesheet2](#), [Stylesheet3](#), [Stylesheet4](#).

No Styles

This page uses DIV elements to group different sections of the HTML page. Click here to see how the page looks like with no stylesheet:

[No Stylesheet](#).

Side-Bar

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Style 1

Welcome to My Homepage

Use the menu to select different Stylesheets

Stylesheet 1

Stylesheet 2

Stylesheet 3

Stylesheet 4

No Stylesheet

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Style 2

Welcome to My Homepage

Use the menu to select different Stylesheets

Same Page Different Stylesheets

This is a demonstration of how different stylesheets can change the layout of your HTML page. You can change the layout of this page by selecting different stylesheets in the menu, or by selecting one of the following links:
[Stylesheet1](#), [Stylesheet2](#), [Stylesheet3](#), [Stylesheet4](#).

No Styles

This page uses DIV elements to group different sections of the HTML page. Click here to see how the page looks like with no stylesheet:
[No Stylesheet](#).

Stylesheet 1

Stylesheet 2

Stylesheet 3

Stylesheet 4

No Stylesheet

Side-Bar

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Style 3

Welcome to My Homepage

Use the menu to select different Stylesheets

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- [Stylesheet 2](#)
- [Stylesheet 3](#)
- [Stylesheet 4](#)
- [No Stylesheet](#)

Side-Bar

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Same Page Different Stylesheets

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Web Scripting

Programming languages for adding dynamic capabilities to a website.

Gives you the ability to make changes to your website by changing the DOM.
(Make changes to the background color, change images in a slideshow, animate certain html elements).

Load data from a back-end server (fetch user data from a database, validate a users' identity, or load resources from a file server).



Examples of Scripting Languages

Javascript: Most popular client-side scripting languages. Goes hand in hand with HTML/CSS, and runs in the browser.

PHP (Hypertext Preprocessor): Server-side scripting language primarily used for Back-End processes. Commonly used together with Javascript.

ASP (Active Server Pages): Development framework for building websites. Encompasses both Front-End and Back-End development.

Questions? Comments? Concerns?



DEBUGGING

**I DON'T KNOW WHERE YOU ARE, I DON'T KNOW
HOW YOU WORK, BUT I WILL FIND YOU, AND**

I WILL FIX YOU

Quiz #2 - Web Design / Dev

<http://apps.palmbeachschools.org/PocketQuiz/Home>

Password: Manhattan46

Influences in Technology

Taking over the world since 1946

ENIAC - Electronic Numerical Integrator and Computer

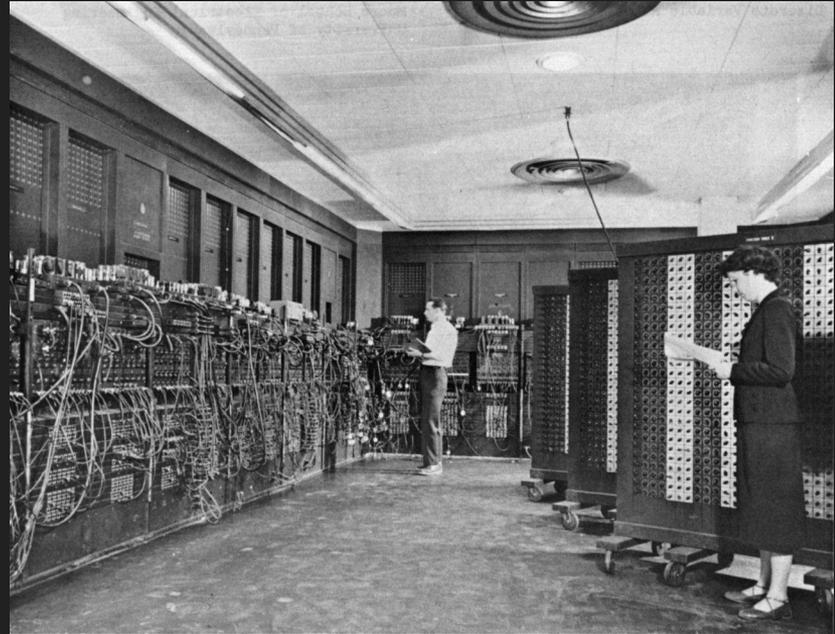
Created on February 15th, 1946 at the University of Pennsylvania.

Total cost was ~\$487,000 dollars to develop (~\$6,887,000 today).

Weight over 27 tons, was 1,800 sq ft of space, and consumed ~150 kW of electricity (average computer today uses 150 watts, or one thousand times less energy), thus causing massive brownouts throughout the university. It was rumoured, that whenever the ENIAC was switched on, lights throughout all of Philadelphia dimmed.

Designed to calculate artillery firing tables with nuclear missiles for US Army's Ballistic Research Laboratory.

Powerful enough to calculate a missile trajectory that took a human over 20 hours, in just 30 seconds.



Average Home Computer

CPU: 3.6Ghz Processor

Memory: 8GB RAM

HardDrive Space: 1TB HD

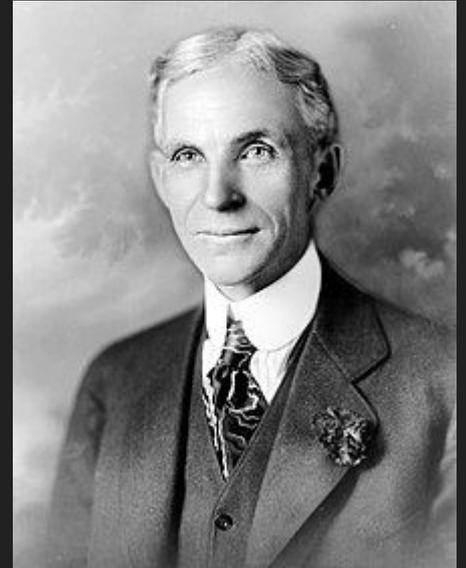
Price: \$599.00



Influences in Technology - Henry Ford

“Nothing is particularly hard if you divide it into small jobs.”

- Founded Ford Motor Company.
- Created assembly line which reduced time it took to build a car from twelve hours to two hours and thirty minutes. December 1st, 1913.
- Offered \$5 dollars a day wage, which was double the average, that brought in skilled laborers from other companies.
- Created five-day work week which gave workers more leisure time and in turn, made them more productive.

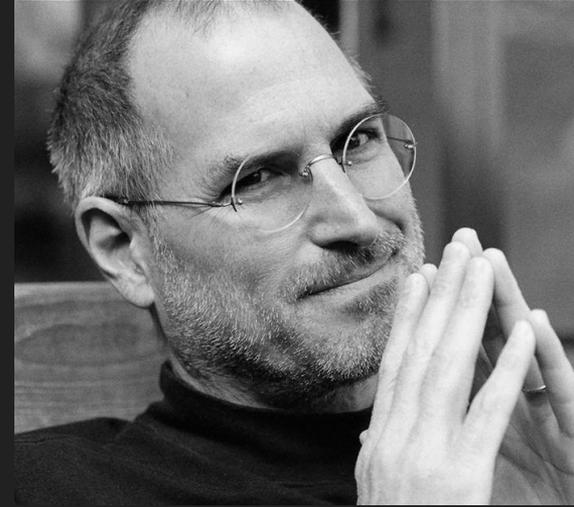


Henry Ford
Founder of Ford Motor Company

Influences in Technology - Steve Jobs

“Everybody in this country should learn to program a computer, because it teaches you how to think”

- Dropped out of college to co-found Apple Inc (1976), became chairman to Pixar and member of Disney’s board of directors.
- Apple created one of the first highly successful, mass produced, personal computer in the world. Modern User Interface and mouse based on early Apple designs.
- Forced out of Apple in 1985. Rejoined Apple in 1997 and became the CEO within just a few months, and saved company from bankruptcy.
- Revolutionized digital music with iPod and iTunes.
- Revolutionized smartphone market with release of iPhone.



Steve Jobs
Founder of Apple

Influences in Technology - Elon Musk

"When Henry Ford made cheap, reliable cars, people said, 'Nah, what's wrong with a horse?' That was a huge bet he made, and it worked."

- Began learning programming by himself at age 12.
- Dropped out of college to pursue entrepreneurship to create both Zip2 and spacex.com. Both companies were sold, first to Compaq and then Paypal, totaling 1.8 billion dollars.
- Founder of SpaceX, co-founder of Tesla Inc and OpenAI.
- Working towards reducing global warming through sustainable energy, and establishing a human colony on Mars.



Elon Musk
Founder of SpaceX



Starman and his electric sports car are aiming for an endless road trip past Mars



Questions? Comments? Concerns?



Quiz #3 - Influences in IT

<http://apps.palmbeachschools.org/PocketQuiz/Home>

Password: Manhattan46

Professional Skills in IT

The Non-technical aspects of the IT world

Teamwork

The combined action of a group of people, working together to reach a common goal. Our goal in this instance would be to develop a product that will provide the best experience possible for the end user (customer).

Communication: How well do the members of the team discuss the development process?

Collaboration: How well do members of the team work together on a piece of the project?

Creativity: How do we use imagination and original ideas to aid in production of a project?

Innovation: How do we improve a process or particular area of a project?

Software Development Methodologies

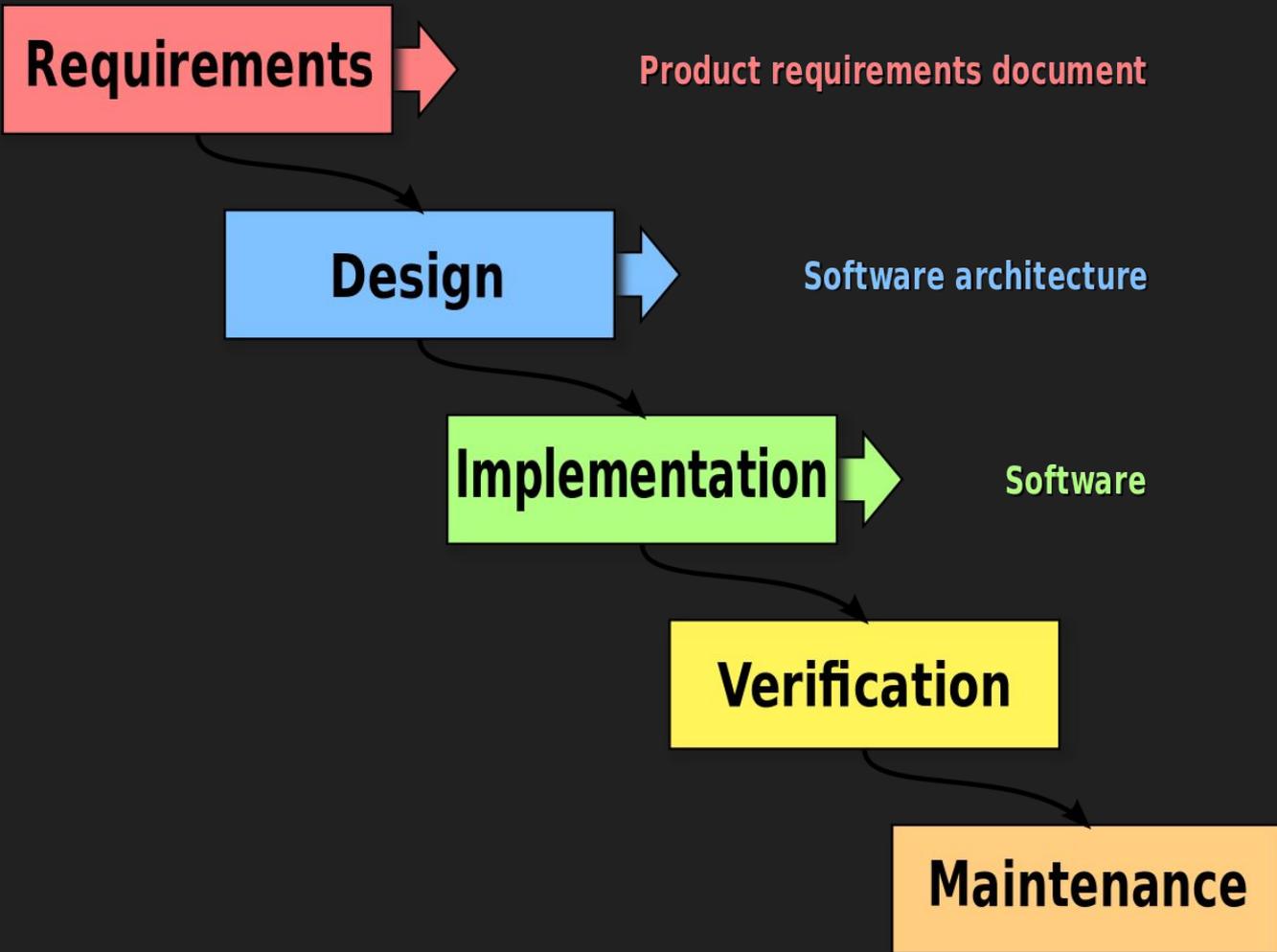
System of methods applied to the software development process. Basically, rules for developing software with a team of people.

Popular Types:

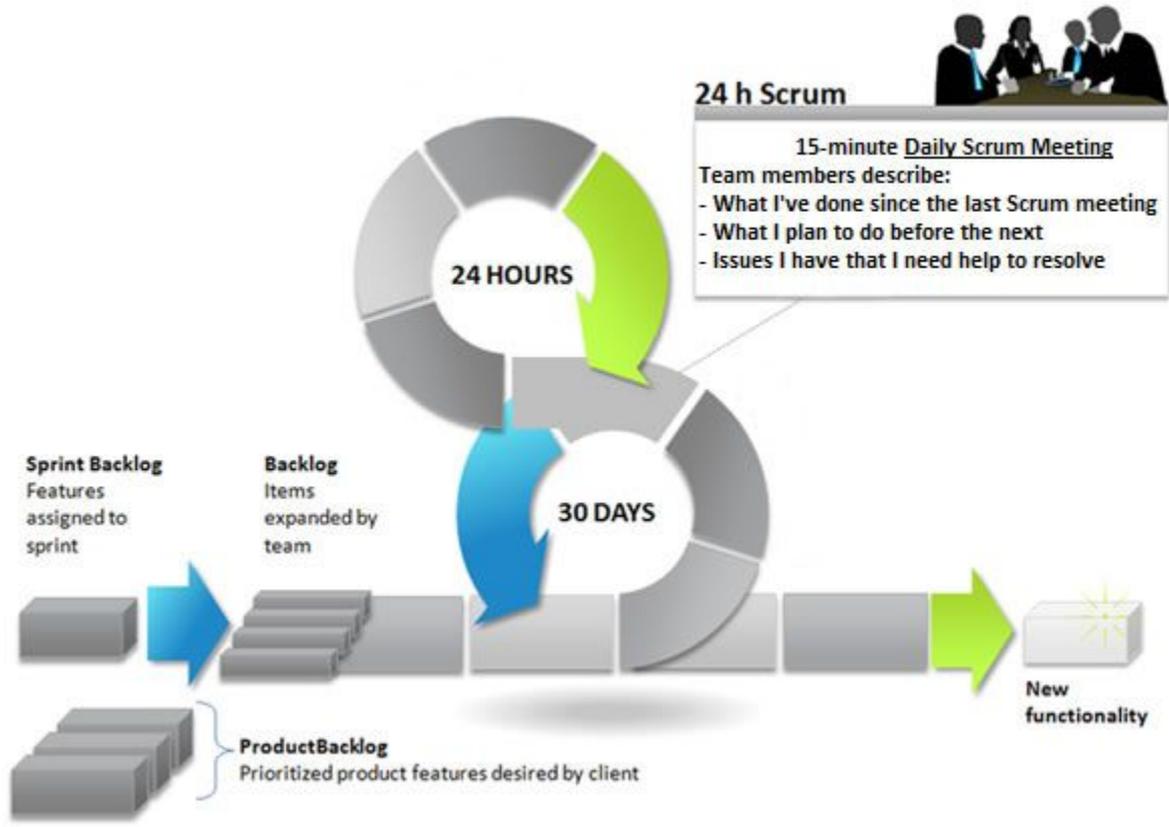
Waterfall Development: Linear approach, flows downwards like a waterfall.

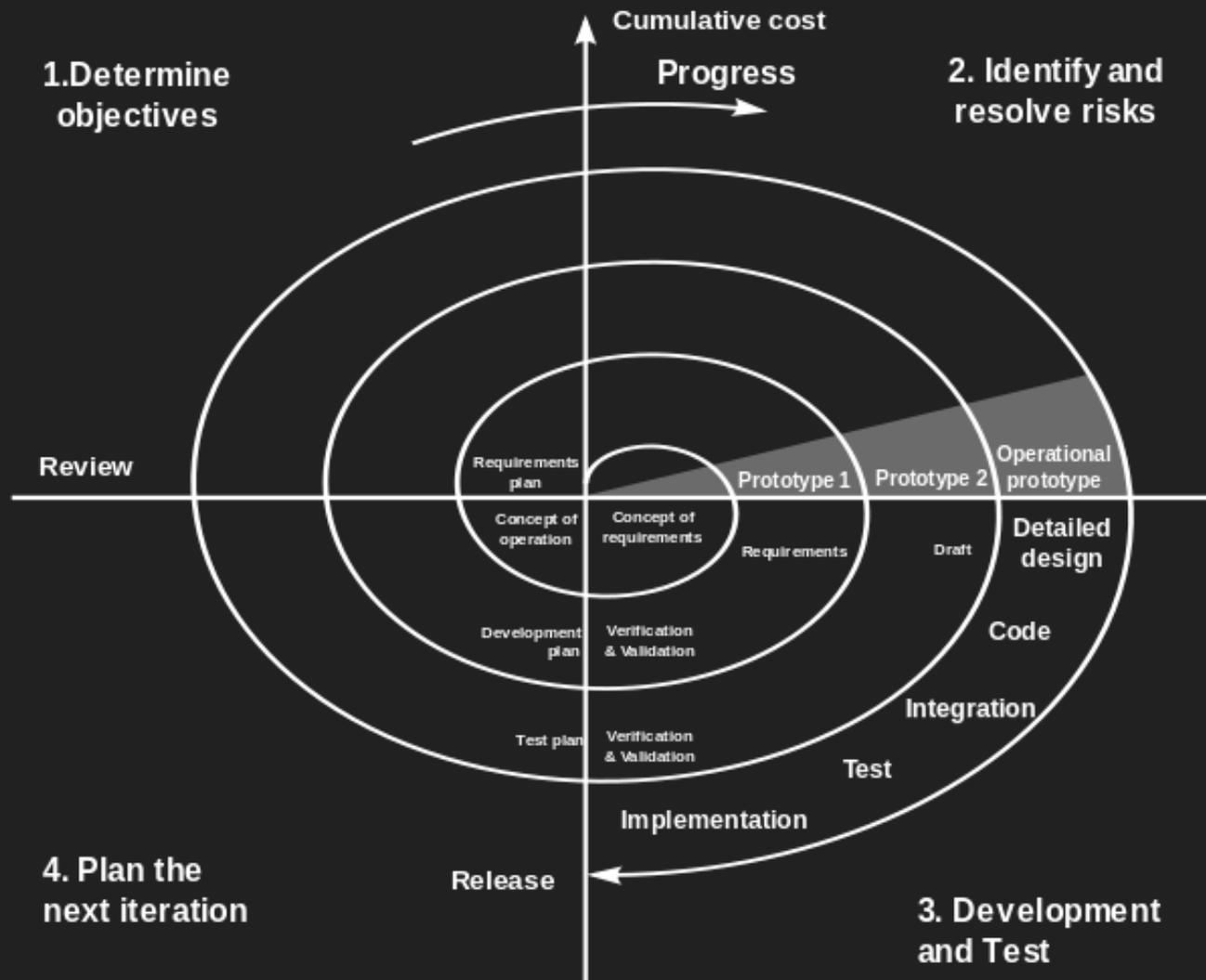
Agile Development: Requirements and solutions evolve throughout the software development process.

Spiral Development:



SCRUM PROCESS





Customer Care

A customer in software development is a person or group that tasks us with a product that needs to be created and delivered, based on their specific needs.

Most customers are not tech-savvy, and require a team to cater to their needs, which is why it's important to communicate with your customer during the application development process.

The software application is always based on the customers' needs, and they may want all the bells and whistles, but sometimes the most simplistic designs can be exactly how a customer wants their product.



The Importance of Self Learning/Study (Autodidacticism)

auto-die-dac-tism

Definition: Education without the guidance of teachers/professors.

- Explore new areas of interests. Encourages curiosity.
- Learn at your own pace and your own leisure.
- Develop skills that are above and beyond your regular classmates.
- Boosts confidence and self-esteem.
- Branch off into other areas of interest and further your knowledge.

Resources & Where to find them ~

- Your local library
- The Internet
- Clubs / Code Camps / Events
- Friends & Family

Questions? Comments? Concerns?



Actual
programming



Debating for
30 minutes on
how to name a
variable

Quiz #4 - IT Skills

<http://apps.palmbeachschools.org/PocketQuiz/Home>

Password: Manhattan46



Automation

The world of tomorrow, today!

What is automation?

- The use of automatic equipment in a system of manufacturing or other process.
- Developments of machines and automation software in the workplace to improve production and reduce costs.
- Machines set to overtake humans in the workforce by 2025.



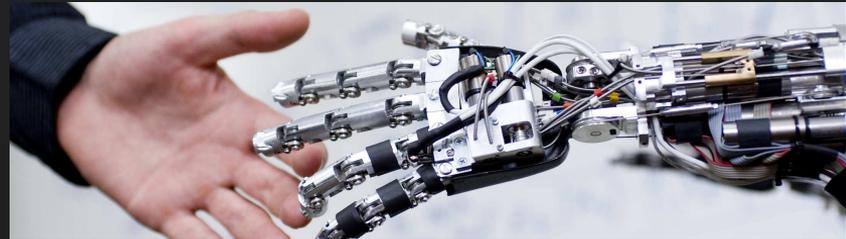
Automation and the Job Market

- Estimated 45% of all jobs may be replaced by automation (80 million) by 2030.
- Artificial Intelligence & Robotics to create 58 million jobs by 2022.
- An additional 133 million jobs are set to emerge to help transition the process and fill in the gaps.
- Computer Science / Engineering jobs set to be in top 10 fastest growing and high demand jobs.
- Green Energy currently fastest growing field across all job sectors.

Source: *Humans Need Not Apply* <https://www.youtube.com/watch?v=7Pq-S557XQU>

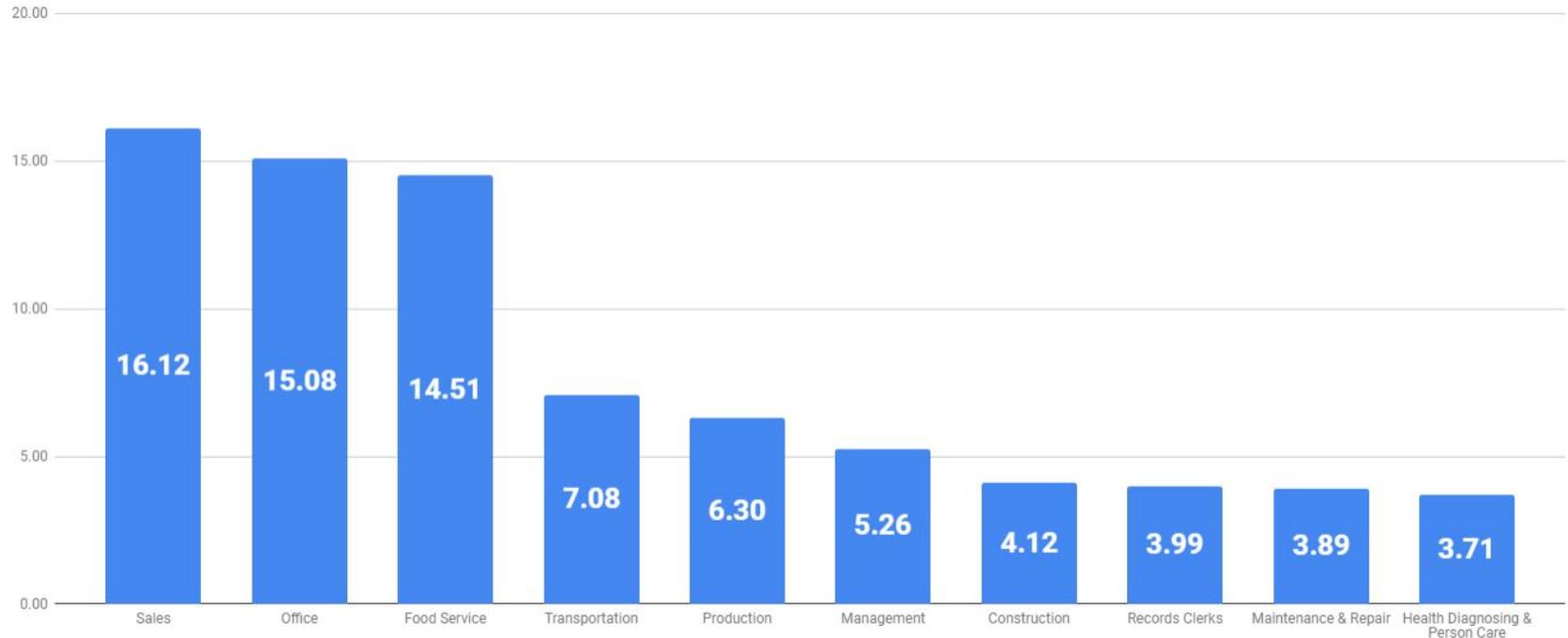
Pros / Cons of Automation

- Boost productivity
- Lower cost of goods and services
- Reduce risk of human injury on job
- Reduces number of jobs in the market
- Increased energy consumption
- High cost of entry



Top 10 Occupations in the US by Field

Source: United States Department of Labor (2018) - 144,733,270 Jobs Total



Source: US Bureau of Labor Statistics https://www.bls.gov/oes/current/oes_nat.htm

PROJECT MANAGEMENT SOFTWARE



Source: CNN Business <https://www.youtube.com/watch?v=2u007Msg1qo>

Questions? Comments? Concerns?

YOU CAN'T HAVE ERRORS IN YOUR CODE

**IF YOU WRAP THE ENTIRE CODEBASE
IN A TRY/CATCH BLOCK**

Quiz #9 - Automation

<http://apps.palmbeachschools.org/PocketQuiz/Home>

<http://l.sdabc.net/dy8yv>

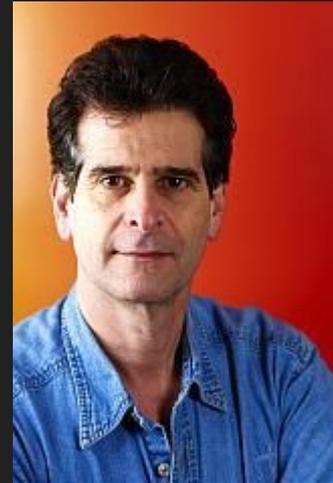
FIRST Robotics Club

For Inspiration & Recognition of Science & Technology

Vision & Mission

Inspire people to be science and technology leaders and innovators, by engaging them in exciting mentor-based programs that build science, engineering, and technology skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence and leadership.

“FIRST is more than robots. The robots are a vehicle for students to learn important life skills. Kids often come in not knowing what to expect - of the program nor of themselves. They leave, even after the first season, with a vision, with confidence, and with a sense that they can create their own future” - Dean Kamen



FIRST Core Values

- **Discovery:** *We explore new skills and ideas.*
- **Innovation:** *We use creativity and persistence to solve problems.*
- **Impact:** *We apply what we learn to improve our world.*
- **Inclusion:** *We respect each other and embrace our differences.*
- **Teamwork:** *We are stronger when we work together.*
- **Fun:** *We enjoy and celebrate what we do!*

615K+

students in
100+ countries

250K+

mentor, coach, judge,
and volunteer roles

18M

volunteer hours
served

\$80M+

scholarship opportunities
from nearly 200 providers

3,000

events in
90+ countries

70K

participants at annual
FIRST Championship

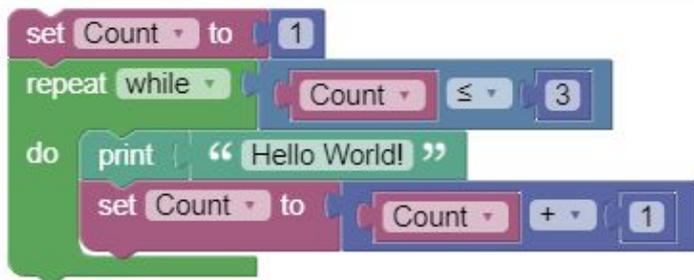


WENDY
FIRST Student

Programming FIRST Robot

- Google Blockly - visual coding language built by Google.
- Simple, easy to use drag and drop controls are perfect for entry level users.
- Requires no compiler or additional software (can run off web).
- Automatically converts what you design into Javascript, php, python, LUA, Dart and/or other languages.
- 100% free to use.

- Logic
- Loops
- Math
- Text
- Lists
- Color
- Variables
- Functions



Language: JavaScript

```
var Count;
```

```
Count = 1;
```

```
while (Count <= 3) {  
  window.alert('Hello World!');  
  Count = Count + 1;  
}
```





Programming with Blockly

View Op Mode | Download Op Mode

Op Mode Name: AutoMove | [Add Comments](#) | Group:

- LowerOpModes
- Gamepad
- Actuators
- Sensors
- Other Devices
- Android
- Utilities
- Logic
- Loops
- Math
- Text
- Lists
- Variables
- Functions
- Miscellaneous

```
when green flag clicked  
  set position to 0  
  set direction to 90  
  when green flag clicked  
    move 100 cm forward  
    turn right 90 degrees  
  when green flag clicked  
    move 100 cm forward  
    turn right 90 degrees  
  when green flag clicked  
    move 100 cm forward  
    turn right 90 degrees
```

Network 0000 rc | Ping 4ms

100% | no voltage error

Select Op Mode
Autonomous (TMR)

INIT

Status: Robot is stopped

Perks of joining FIRST

- Design, build, program and operate robots to compete in a head-to-head challenge in an alliance format.
- Robot operates on a field that contains missions and obstacles to score points for your team.
- Technical and non-technical skills are welcomed and needed.
- Builds skills in engineering, programming, and teamwork.
- Earn scholarships and other exclusive educational funding.

FIRST Programs

- Lego League Jr: Ages 6-10
- Lego League: Ages 9-14
- Tech Challenge: Grades 7th-12th
- Robotics Competition: Grades 9th-12th



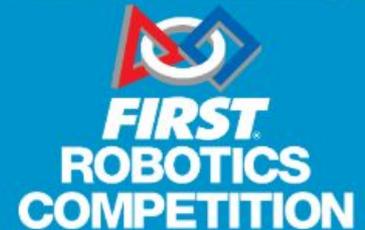

FIRST
LEGO
LEAGUE JR.




FIRST
LEGO
LEAGUE




FIRST
TECH
CHALLENGE




FIRST
ROBOTICS
COMPETITION



How to join FIRST

Contact your guidance counselor or academic coordinator to learn about the availability of FIRST programs at your school.

Visit the FIRST website: <https://www.firstinspires.org/>

Speak to your parents about joining or creating your own team:

<https://www.firstinspires.org/resource-library/youth-team-member-consent-and-release-form>

Questions? Comments? Concerns?



Quiz #8 - FIRST Robotics

<http://apps.palmbeachschools.org/PocketQuiz/Home>

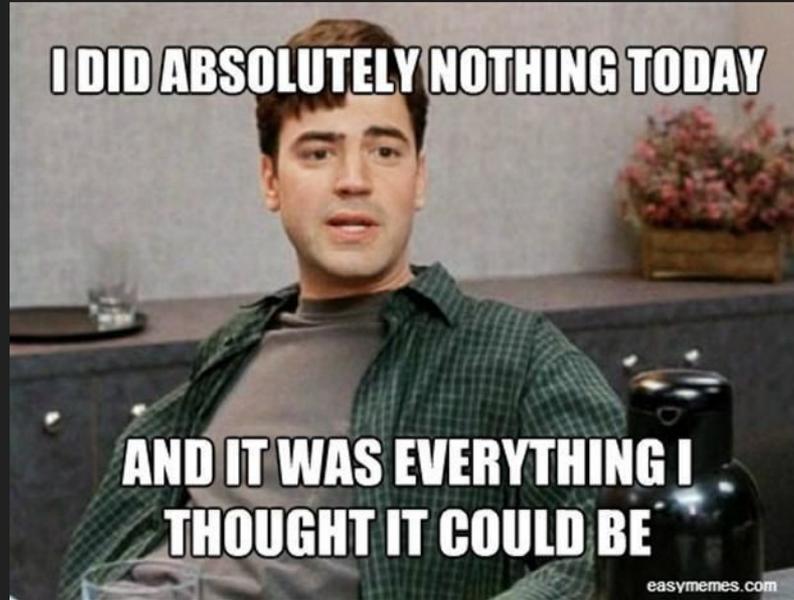
<http://l.sdabc.net/dy8yv>

Questions? Comments? Concerns?



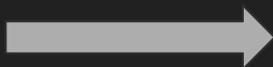
In Closing...

Have a fun, educational & safe summer!



Resources

Website from presentation



Self Learning Resources:

<https://www.w3schools.com>

<https://www.codecademy.com>

<https://www.khanacademy.org>

<https://developers.google.com/blockly/>

<https://www.firstinspires.org/robotics/frc>

<http://www2.palmbeachschools.org/palmsprings/>



Quiz #5 - School Information

<http://apps.palmbeachschools.org/PocketQuiz/Home>

<http://l.sdabc.net/dy8yv>

Quiz #6 - Programming Questions

<http://apps.palmbeachschools.org/PocketQuiz/Home>

<http://l.sdabc.net/dy8yv>

Quiz #7 - Bonus Round

<http://apps.palmbeachschools.org/PocketQuiz/Home>

<http://l.sdpbc.net/dy8yv>