



# Level 0x10

Future Work



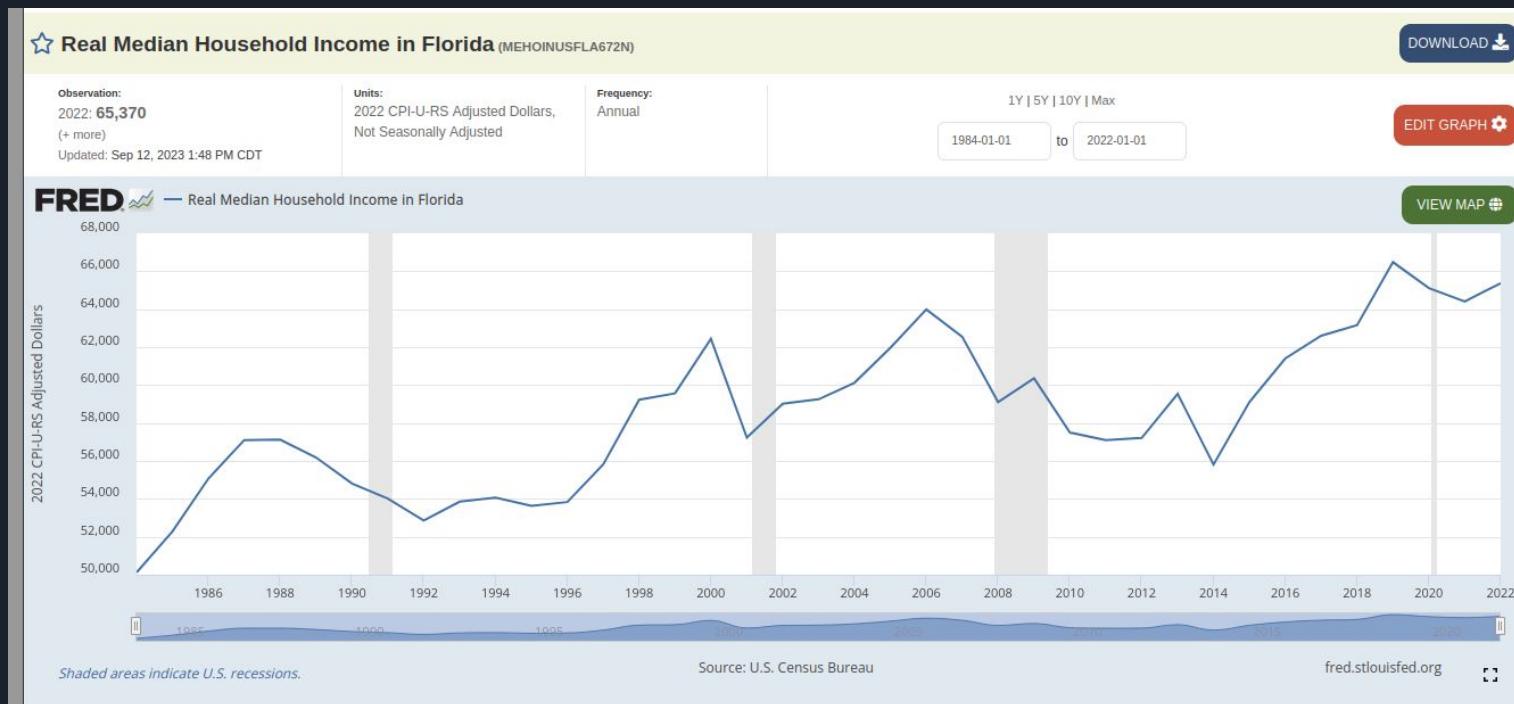
# Topics

- College / Investing in Education
- Internships
- Games and Hacking

# How much will a home cost?

|                        | Pre 2017       | 2022 - 2024<br>Old Interest<br>Rate | 2024 Price<br>and<br>Interest Rate | 2025 Price<br>and Interest<br>Rate |
|------------------------|----------------|-------------------------------------|------------------------------------|------------------------------------|
| Median Price Home      | \$250,000      | \$380,000                           | \$380,000                          | \$402,000                          |
| Interest Rate          | 4.0 %          | 4.0 %                               | 8.5 %                              | 6.5 %                              |
| Downpayment (10%)      | \$25,000       | \$38,000                            | \$38,000                           | \$40,200                           |
| <b>Monthly Payment</b> | <b>\$1,074</b> | <b>\$1,633</b>                      | <b>\$2,630</b>                     | <b>\$2,300</b>                     |
| Interest Paid Lifetime | \$161,706      | \$245,794                           | \$604,686                          | \$461,455                          |

# Median Income Household Florida (2022)



# Median Income Household Florida (2023)





# Cost of Bachelor's Degree

- University of Florida
  - Undergrad: \$212 / credit.  $120 * \$\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$
  - Graduate: \$530 / credit.  $30 * \$530 = \$15,900$
- University of Central Florida
  - Undergrad: \$212 / credit.  $120 * \$\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$  (was \$67 in late 1990s)
  - Graduate: \$369 / credit.  $30 * \$369 = \$11,070$
- University of Miami
  - Undergrad: \$2,310 / credit.  $120 * \$\underline{\hspace{2cm}} = \$\underline{\hspace{2cm}}$  (now \$2,530)
- Florida Tech
  - Undergrad: \$21,710 / semester.  $8 * \$\underline{\hspace{2cm}} = \$\underline{\hspace{2cm}}$  (now \$22,310)
- Eastern Florida State College
  - AA (1000/2000 level): \$104 / credit.  $60 * \$\underline{\hspace{2cm}} = \$\underline{\hspace{2cm}}$
- Books: \$       / yr
- Living Expenses: \$       / year



# Cost of Bachelor's Degree

- University of Florida
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- University of Miami
  - Undergrad: \$2,530 / credit.  $120 * \$2,310 = \$277,200$  ~~\$303,600~~
- Florida Tech
  - Undergrad: \$22,310 / semester.  $8 * \$21,710 = \$173,680$  ~~\$178,400~~
- Eastern Florida State College
  - AA (1000/2000 level): \$104 / credit.  $60 * \$104 = \$6,240$
- Books: \$1,000 / yr
- Living Expenses: \$12,000 / year



# Bright Futures Scholarship

- Academic Scholarship
  - 3.50 GPA, 1330 SAT or 29 ACT
  - 100% of tuition at public university
  - \$6,350 / year
- Medallion Scholarship
  - 3.0 GPA, 1210 SAT or 25 ACT
  - 75% of tuition at public university
  - \$4,762 / year

# Student Loans

- Borrow money for school, pay back after you graduate (typically over 10 years)
  - Used by 70% of students, average balance is \$30K
  - $\frac{1}{3}$  of borrowers never pay off their loans
  - They are difficult to discharge via bankruptcy
- In June 2010, student loan debt exceeded credit card debt
- Hot political issue, would be risky to assume laws won't change the next few years



# Payscale.com College Salary Report (2024 ed)

## Highest Paying Jobs With a Bachelor's Degree

Your major can have an even bigger impact on future earnings than choice of school. Find out which majors pay you back, and which make it hard to pay back student loans.

[Read more](#)

Search Majors 

| Rank | Major  | Degree Type | Early Career Pay | Mid-Career Pay | % High Meaning |
|------|--|-------------|------------------|----------------|----------------|
| 1    | Petroleum Engineering                            | Bachelors   | \$93,200         | \$187,300      | 67%            |
| 2    | Operations Research & Industrial Engineering     | Bachelors   | \$84,800         | \$170,400      | 28%            |
| 3    | Electrical Engineering & Computer Science (EECS) | Bachelors   | \$108,500        | \$159,300      | 46%            |
| 4    | Interaction Design                               | Bachelors   | \$68,300         | \$155,800      | 55%            |
| 5    | Public Accounting                                | Bachelors   | \$59,800         | \$147,700      | 47%            |
| 6    | Operations Research                              | Bachelors   | \$83,500         | \$147,400      | 54%            |
| 7    | Applied Economics and Management                 | Bachelors   | \$66,100         | \$146,400      | 67%            |
| 8    | Business Computing (BC)                          | Bachelors   | \$73,000         | \$143,600      | -              |
| 9    | Actuarial Mathematics                            | Bachelors   | \$64,300         | \$143,400      | 51%            |
| 10   | Electrical Power Engineering                     | Bachelors   | \$76,100         | \$142,600      | 68%            |
| 11   | Information & Computer Science                   | Bachelors   | \$58,600         | \$140,900      | 62%            |

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Search Majors



| Rank | Major  | Degree Type | Early Career Pay | Mid-Career Pay | % High Meaning |
|------|--|-------------|------------------|----------------|----------------|
| 1    | Petroleum Engineering                            | Bachelors   | \$98,100         | \$212,100      | 60%            |
| 2    | Operations Research & Industrial Engineering     | Bachelors   | \$101,200        | \$202,600      | 21%            |
| 3    | Electrical Engineering & Computer Science (EECS) | Bachelors   | \$128,500        | \$192,300      | 45%            |
| 4    | Interaction Design                               | Bachelors   | \$77,400         | \$178,800      | 55%            |
| 5    | Building Science                                 | Bachelors   | \$71,100         | \$172,400      | 46%            |
| 6    | Applied Economics and Management                 | Bachelors   | \$81,200         | \$169,300      | 47%            |
| 7    | Actuarial Mathematics                            | Bachelors   | \$71,200         | \$167,500      | 48%            |
| 8    | Optical Science & Engineering                    | Bachelors   | \$81,500         | \$166,400      | 73%            |
| 9    | Quantitative Economics                           | Bachelors   | \$78,400         | \$165,100      | 43%            |
| 10   | Operations Research                              | Bachelors   | \$94,900         | \$164,900      | 56%            |
| 11   | Systems Engineering                              | Bachelors   | \$89,700         | \$163,800      | 57%            |
| 12   | Information & Computer Science                   | Bachelors   | \$73,200         | \$162,900      | 65%            |





# Most In Demand College Majors - Kiplinger

## 1. Computer Engineering

- Starting salary: \$83,100
- Mid-career salary: \$135,000
- Job satisfaction: 70% (Percent who said they
- Job is stressful: 42% (Percent who said their
- Job has meaning: 46% (Percent who said "ve the world a better place?")

## 2. Computer Science

- Starting salary: \$79,700
- Mid Career Salary: \$130,000
- Job Provides Satisfaction: 68%
- Job is Stressful: 39%
- Job Has Meaning: 46%

## 3. Electrical Engineering

- Starting salary: \$77,500
- Mid Career Salary: \$123,000
- Job Provides Satisfaction: 67%
- Job is Stressful: 50%
- Job Has Meaning: 57%

## 4. Chemical Engineering

- Starting salary: \$77,100
- Mid Career Salary: \$130,000
- Job Provides Satisfaction: 64%
- Job is Stressful: 55%
- Job Has Meaning: 57%

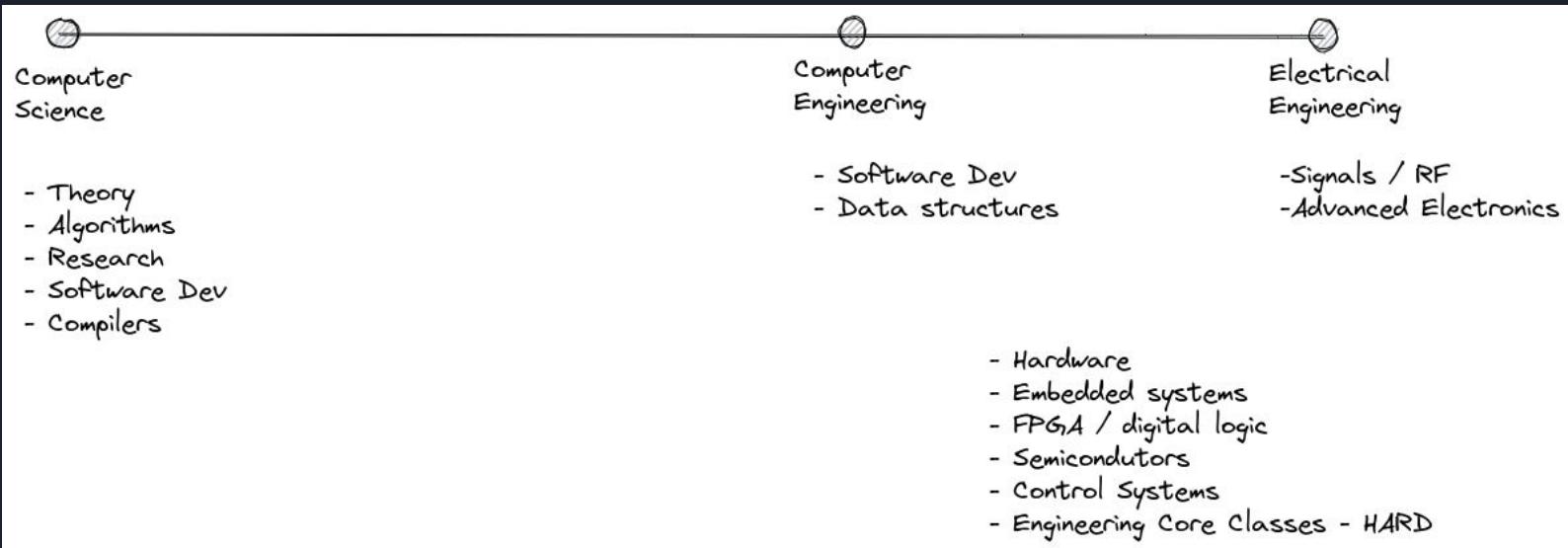
## 5. Aerospace Engineering

- Starting salary: \$76,400
- Mid Career Salary: \$131,000
- Job Provides Satisfaction: 66%
- Job is Stressful: 47%
- Job Has Meaning: 55%

## 6. Mechanical Engineering

- Starting salary: \$72,900
- Mid Career Salary: \$115,000
- Job Provides Satisfaction: 63%
- Job is Stressful: 53%
- Job Has Meaning: 51%

# Which Major? CS vs CpE vs EE



# Nightwing CODEX Internships

NIGHTWING



- CODEX: Cyber Offense & Defense Experts
  - Multiple disciplines: software/hardware vulnerability research, reverse engineering, software engineering
  - What we do: computer network operations, computer network exploitation development, hardware emulation, system engineering, data analytics, and test engineering
  - We work on an array of technologies, including the latest mobile platforms, operating systems, embedded devices, and the newest data analytic platforms.
- [Nightwing Open Positions](#)
  - Summer internship positions will open/appear in January each year
  - Open to college students, any level
  - Offers 1 week PTO (paid time off)
- What to study?
  - Courses: Computer Architecture, OS, Networks, Crypto, Compilers
  - Languages: Python, C
  - CTFs
  - Debuggers and Binary Analysis (IDA, Ghidra, Binary Ninja)
  - Stack / heap based overflows



# RIdiculously Awesome Cyber Internships

Our Cyber LOB supports Offensive Cyber Operations (OCO) missions. We solve challenging problems related to embedded-level software development, network protocols, RF interfaces, reverse engineering, vulnerability research, and computer network operations



- Why work here?
  - We create RIldiculously Awesome solutions that make the world safer.
  - Award Winning Culture - Seriously, awards were won
  - Interns receive 3 paid holidays
  - MentoRIIng you won't receive anywhere else
- What we look for in an intern:
  - US Citizen
  - Typically pursuing a degree in Computer Science, Computer Engineering, or Cyber Security
  - Experience with vulnerability research and reverse engineering through online wargames, CTF competitions, or related platforms
  - Proficiency with assembly language, C/C++, Python, and fundamentals of operating systems
- Interns are on-site:
  - Melbourne, FL
  - San Antonio, TX
  - St. Petersburg, FL
- 3 interns each summer, for 3 months
- RII Careers Page:  
<https://www.researchinnovations.com/careers>
  - Internships will be posted in the Fall

# Cromulence Internships



- Complete 1 year of college
- Apply Jan-March for summer internship
- Interns usually start late May / early June, till August
- What they look for:
  - Computer Engineering, Computer Science, Electrical Engineering
  - Python, C, C++
  - CTF experience
- <https://cromulence.com/careers>
  - Internships appear there, fills fast, apply early
- US Citizen

Their career pages also a great resource for skills, type of work, other information

“We specialize in the development and execution of Computer Network Operation Tools, Cyber Competition Systems, Software Development, Program Analysis Tools, and Vulnerability Research.”



# STR Internships



- What will the day-to-day work consist of during an STR internship?
  - Students will work on real programs with STR, no fake problems or concepts. We want our interns to gain real experience.
- When do the internship and co-op programs happen?
  - STR offers Spring and Fall Co-ops in addition to our Summer Internship program.
- <https://www.str.us/internships/> - Apply in January
- Who do we hire?
  - Electrical Engineering
  - Computer Engineering
  - Computer Science
  - Mathematics, Physics, Data Science and More

“Our full-time staff and interns practice: command and control, machine learning, cyber security, sensors development, signal processing, data analytics, & computer vision”

# Digital Logic

- [nandgame.com](https://nandgame.com)
  - Basic boolean algebra
  - Build primitive digital logic components
  - The building blocks of computers
- From Nand to Tetris
  - Book
  - Lecture Series (available on [Youtube](#))

The screenshot shows a web browser window for "NandGame - Build a computer from scratch" on Mozilla Firefox. The main area displays a logic circuit puzzle titled "Nand". It includes a specification table, component icons in a toolbox, and a workspace for connecting them. A tooltip says "Step 1: Drag components from the toolbox to the blue area". To the right, a sidebar provides game information and help.

**Nand**

Your task is to connect inputs to output through wires and relays such that when both **a** and **b** inputs are 1, the output is 0.

1 represents electrical current, 0 represents no current.

The **V** input carries constant current, i.e. always 1.

The exact specification:

| Input | Output |
|-------|--------|
| a b   | 0 0 1  |
| 0 1   | 1      |
| 1 0   | 1      |
| 1 1   | 0      |

Toolbox:

- relay (default on)
- relay (default off)

Output:

Step 1: Drag components from the toolbox to the blue area.

Input: 0 0 Power + (always 1)

Output: 0

NandGame - Build a computer from scratch — Mozilla Firefox

Welcome to The Nand Game!

You are going to build a computer starting from basic components.

The game consists of a series of levels. In each level, you are tasked with building a component that behaves according to a specification. This component can then be used as a building block in the next level.

The game does not require any previous knowledge about computer architecture or software, and does not require math skills beyond addition and subtraction. (It does require some patience—some of the tasks might take a while to solve!)

Your first task is to build a nand component.

On the left of the diagram is the exact specification of the task. Click "Level Help" for further information which might be helpful.

The screenshot shows the homepage of "From Nand to Tetris: Building a Modern Computer from First Principles" at [www.nand2tetris.org](http://www.nand2tetris.org). It features a banner with a Tetris player and text, a video thumbnail of Noam Nisan speaking, and a caption.

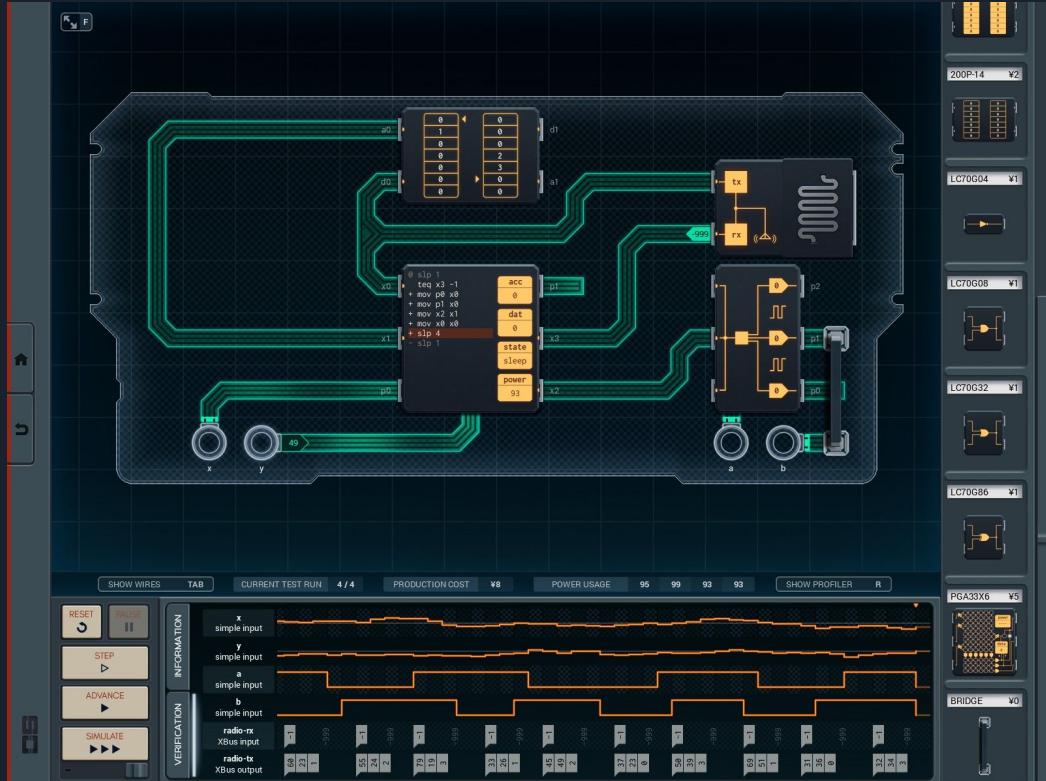
**From Nand to Tetris**

Noam Nisan and Shimon Schocken

Subtitles/clos

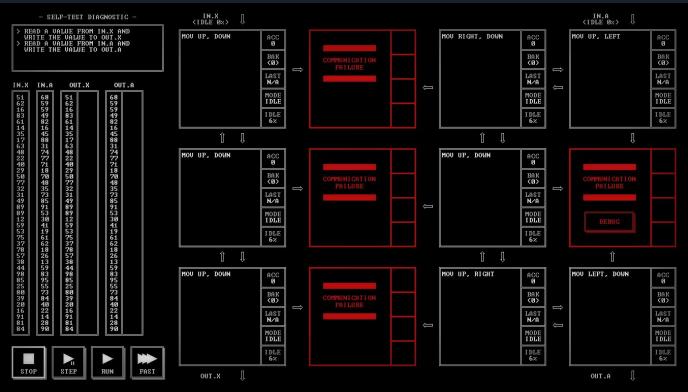
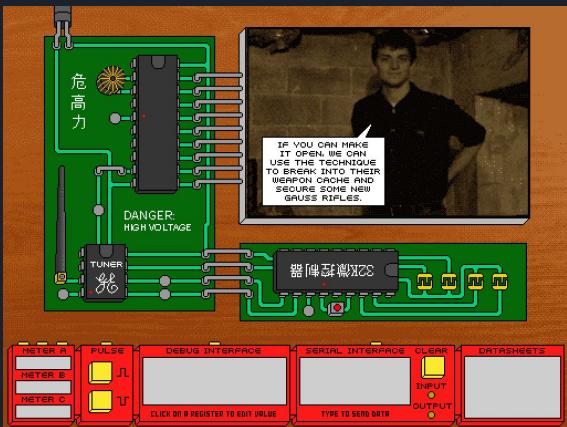
# Shenzhen I/O

- PC / Steam Game
  - 95% positive rating
  - \$14.99
- Layout skills
- Assembly skills
- Timing diagrams
- Digital circuits



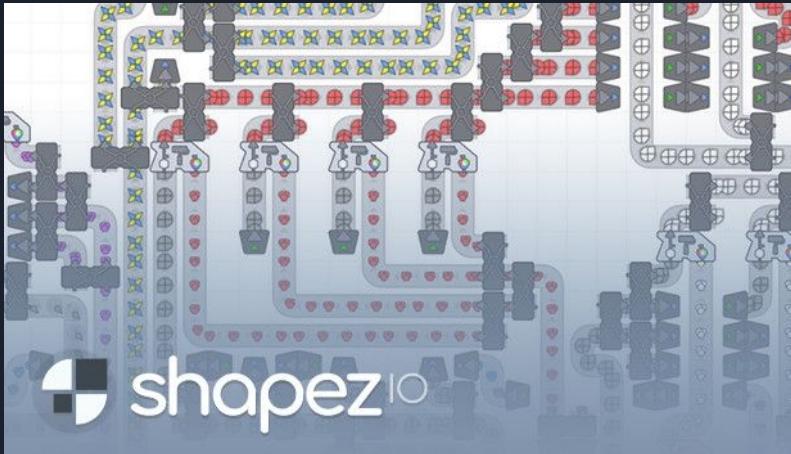
# Other Zachtronics Titles

- TIS-100 (95% positive)
- Exapunks (96% positive)
- Last Call BBS (94% positive)
- Ruckingenur II
- KOHCTPYKTOP



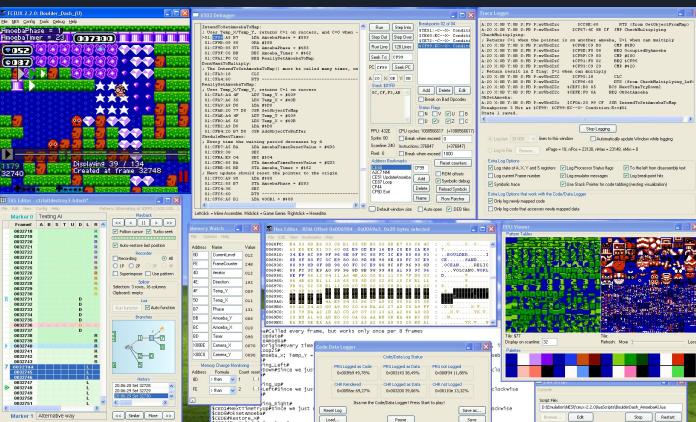
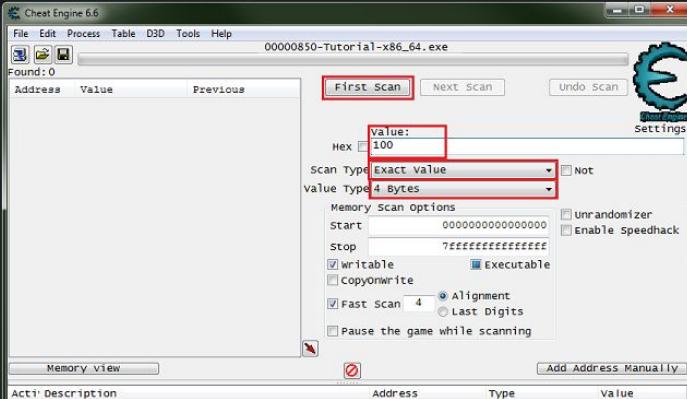
# Factorio

- PCB Layout
- Pipelines
- Parallelization
- Other similar games:
  - Satisfactory
  - Shapez IO



# Game Hacking

- Cheat Engine
  - Learn how memory can be manipulated
  - USE CAUTION
    - Some games may check for cheat engine
    - Don't get banned!
- Console Emulators
  - NES: fceux
  - Advanced debuggers
  - How much RAM does NES have?

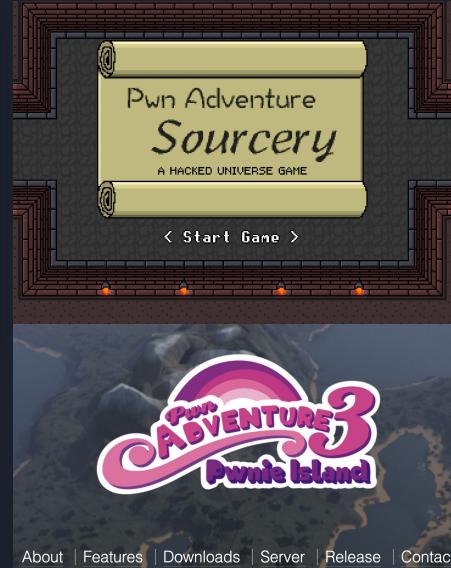


# Hackable Games

## PwnAdventure

- [PwnAdventure2](#)
- [PwnAdventure3](#)
- [PwnAdventureZ](#) (NES)
- Online [emulator](#)
- [SuperMonsterBall](#)
- [Sourcery](#) (Online)

## Squally



# CTFs

- [316ctf](#)
- picoCTF
- Over the Wire
  - <https://overthewire.org/wargames/bandit/>
- HackTheBox.com
- [Cyber Quest Academy](#) (Lockheed Martin)
- [Code Quest Academy](#) (Lockheed Martin)
- [MicroCorruption](#) - MSP430

The screenshot shows a debugger interface with several panes:

- Disassembly:** Shows assembly code for a function named `_trap_interrupt`. The assembly includes instructions like `mov #0x4400, sp`, `and.b r5, #0x015c`, and `mov r15, r15`.
- Register State:** Displays CPU registers with their current values. For example, `pc` is at `4400`, `sp` is `0000`, and `r08` is `0000`.
- Current Instruction:** Shows the instruction at address `3140 0044`, which is `mov #0x4400, sp`.
- Debugger Console:** A text area where the user can type commands. It includes a welcome message and instructions for interacting with the debugger.
- Live Memory Dump:** A table showing memory dump data from address `0000` to `0030`. It lists memory values and their corresponding CPU register states (e.g., `r00`, `r01`, etc.).
- I/O Console:** An empty text area for displaying I/O activity.

# Coding Sites

- Codewars.com
- Codeingame.com
- codingbat.com
  - Java
  - Python

Or just write some code  
for a project you are  
interested in, put it on  
github!

The screenshot shows a C++ code editor interface. The code is a solution for a logic gate problem. It includes input handling, logic gate definitions, and output generation. The code uses cin and cout for input and output. It defines logic gates like AND, OR, XOR, etc., and generates four-space-separated strings for each gate's name, signal, and type.

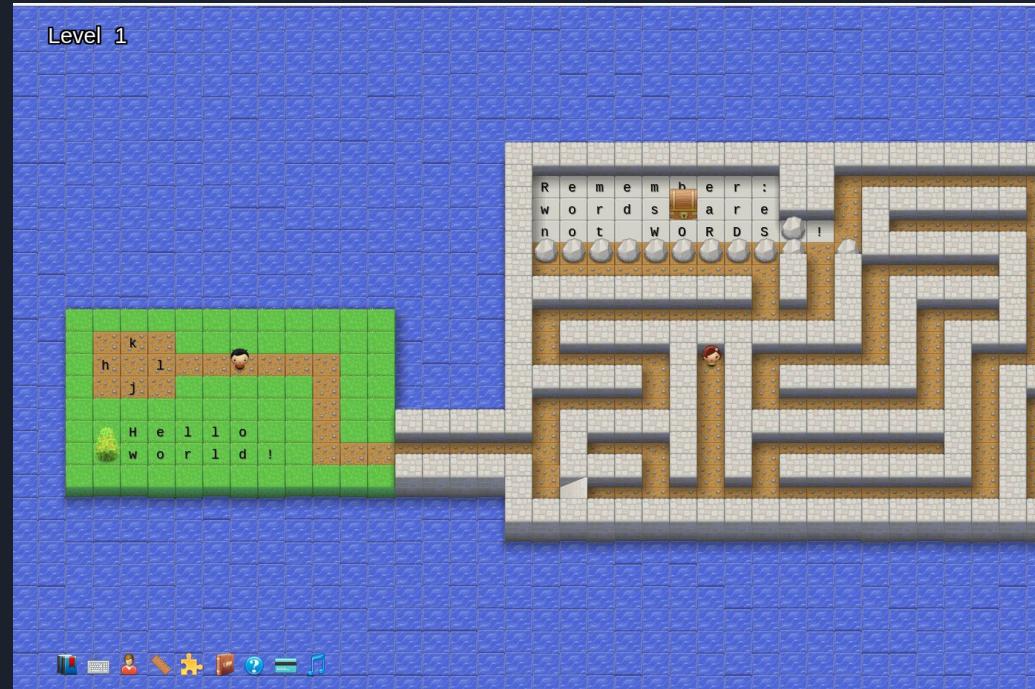
```
int main() {
    int m;
    cin >> m;
    cin.ignore();
    for (int i = 0; i < m; i++) {
        string input_name;
        string input_signal;
        cin >> input_name >> input_signal; cin.ignore();
    }
    for (int i = 0; i < m; i++) {
        string output_name;
        string type;
        string input_name_1;
        string input_name_2;
        cin >> output_name >> type >> input_name_1 >> input_name_2; cin.ignore();
    }
    for (int i = 0; i < m; i++) {
        // Write an answer using cout. DON'T FORGET THE "<< endl"
        // To debug: cerr << "Debug messages..." << endl;
        cout << output_name_and_signal" << endl;
    }
}
```

The interface includes sections for TEST CASES (with two entries: 01 and 02), CUSTOM, and Actions (PLAY ALL TESTCASES, SUBMIT).

# Other Stuff

Vim-adventures.com

Why learn vim?



# Reading

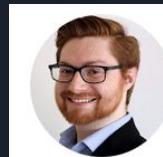
- Hacking: Art of Exploitation
  - C programming
  - Exploitation / bugs
  - If only there was a way to search for PDFs...
- Hack-a-day
  - Web blog
  - Retro projects
  - Embedded projects

The screenshot shows the homepage of Hackaday. At the top, there's a large "HACKADAY" logo with a skull icon. Below it, a banner for "FET: THE FRIENDLY EFFICIENT TRANSISTOR" features two cartoon characters. A sidebar on the left lists "HOME", "BLOG", "HACKADAY.IO", "TINDIE", "HACKADAY PRIZE", "SUBMIT", and "ABOUT". The main content area has a dark background with white text. It includes a "FROM THE BLOG" section with an article thumbnail and a "THIS WEEK IN SECURITY" section. At the bottom right is a "SEARCH" bar.

The screenshot shows the front cover and an open page from the book "HACKING: THE ART OF EXPLOITATION" (2nd Edition). The cover features a black and white image of a terminal window displaying assembly code. The open page shows a terminal session with assembly code, memory dump hex values, and ASCII representation. The text on the page includes "2ND EDITION", "Usage: get remote\_file [local\_file]", and "Program received signal SIGSEGV, Segmentation fault." followed by memory dump details. The No Starch Press logo is at the bottom right.

# Youtube

- [Matt Brown](#)
- [RE//verse Playlist](#)
- [DEFCON Presentations](#)
- [Chaos Computer Club \(CCC\)](#)
- [Live Overflow](#)
  - Hacking, exploitation, CTF
- Adafruit Industries
  - Limor Fried - Lady Ada
  - Making, electronics, microcontrollers
- John Hammond
  - CTF walkthroughs
- Mark Rober
  - Engineering, making



John Hammond

@\_JohnHammond 561K subscribers 1.3K videos

Free cybersecurity education, without the fluff. >



LiveOverflow

@LiveOverflow 799K subscribers  
402 videos

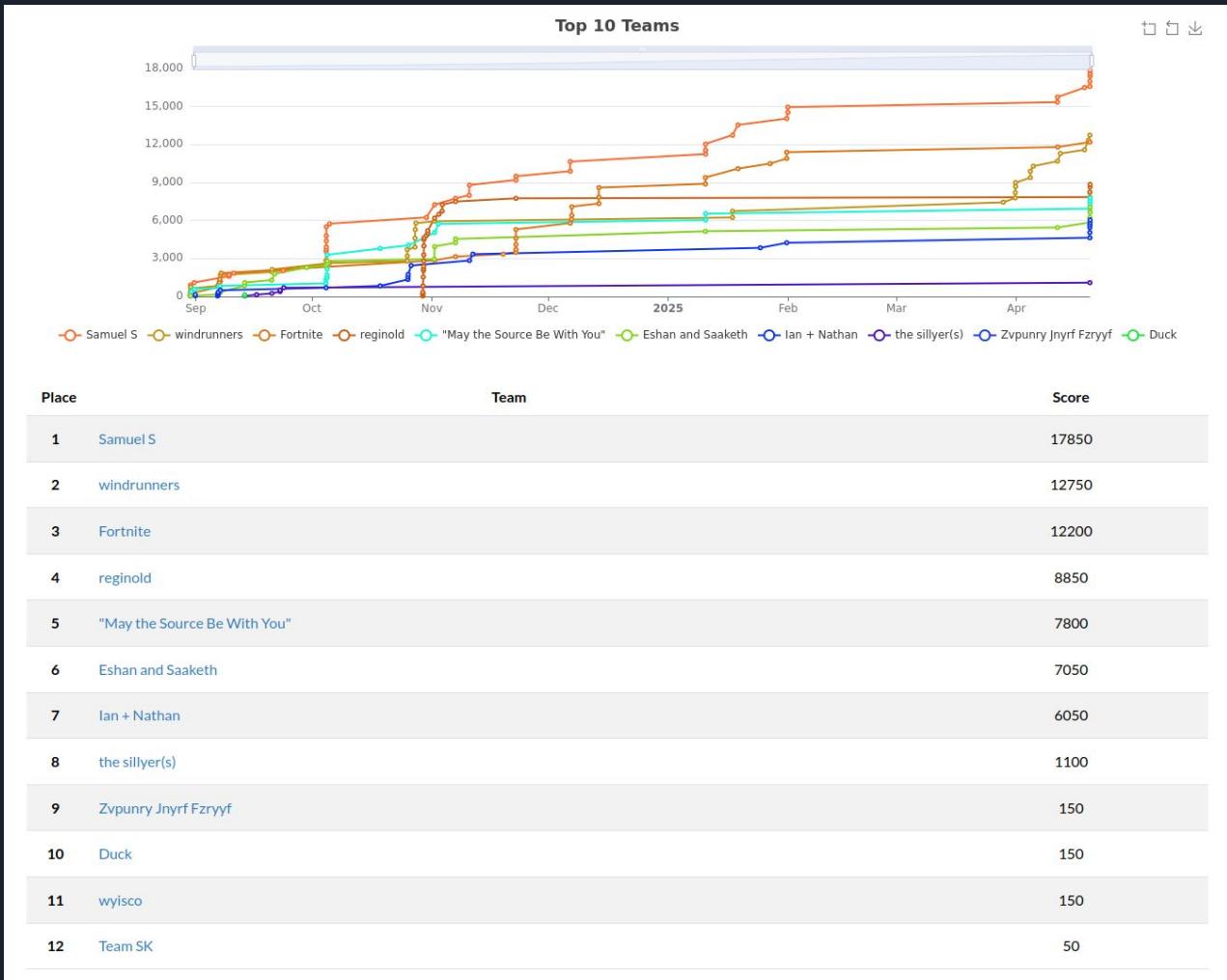
just a wannabe hacker... making video...





# Make something / have a project

- Something that wastes your time but you could improve with software
  - Repetitive tasks / boring work
- What new technology just became popular / affordable?
  - Wireless communications / mobile connectivity / mesh networks
  - AI / Machine learning
- Information processing / aggregation
  - Lots of websites have free APIs
  - Combine 2 different things together
- Make a game / rom hack / mod to existing game, or a demo
- Look for coding jams / hack-a-thons
- What could help a Ukrainian right now?





# Links

- <https://fred.stlouisfed.org/>
- <https://www.nand2tetris.org/>
-