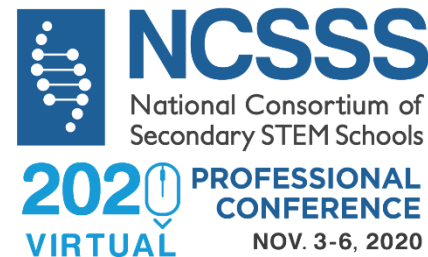


Challenges in educating Gifted Students

Teaching CS while keeping up with the trends in technology

CS Faculty: Tom Meyer and Namrata Pandya
Illinois Mathematics and Science Academy (IMSA)

November 6, 2020



Illinois Mathematics and Science Academy
1500 Sullivan Road
Aurora, IL 60506-1000

History of CS Program at IMSA

Joined IMSA in 2005

Courses offered in 2005

- Object Oriented Programming
- Advanced Programming
- Visual Basic

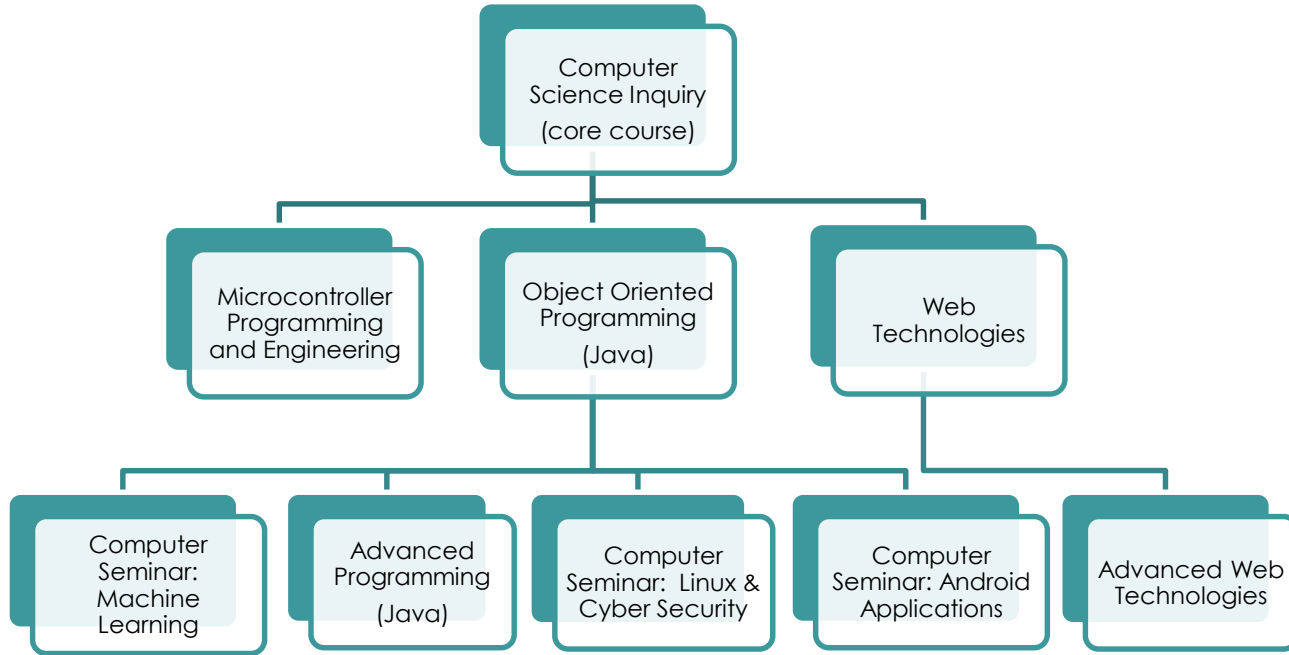
- Used to offer C++ and Assembly if they had enough enrollment

Went through many iterations and revisions where we offered

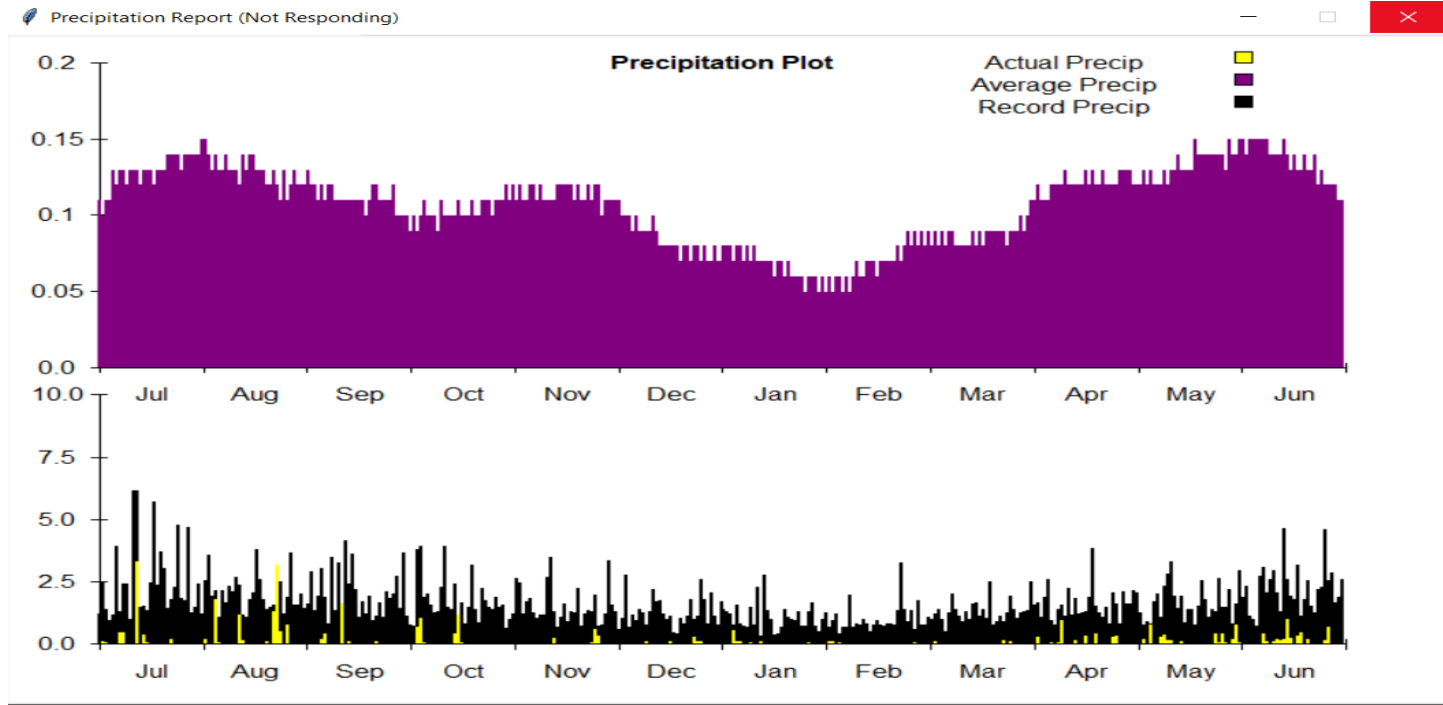
- Computer Science and Emerging Technologies (S08)
- Computational Thinking (S11)
- Robotics (F12)
- Web Tech I and II (F08 and S11)

Enrollment since 2005 has more than doubled in CS.

Our current CS course Offerings



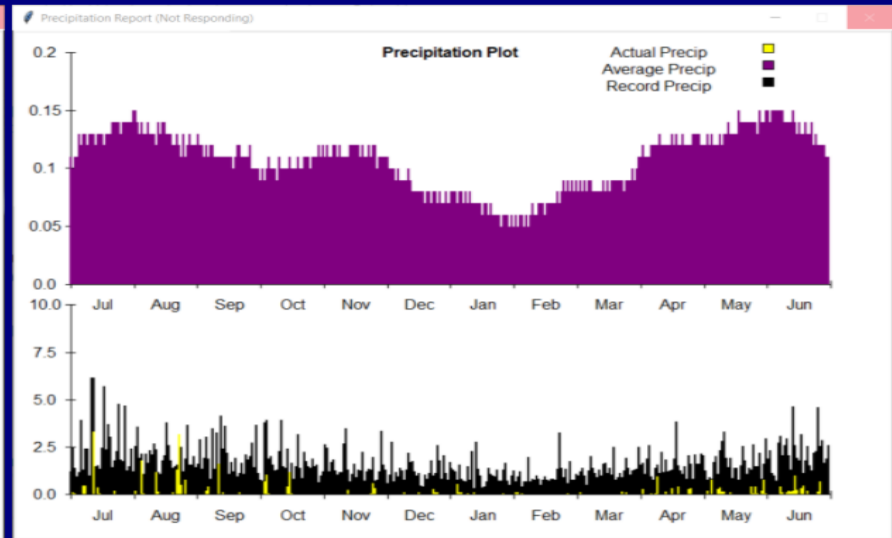
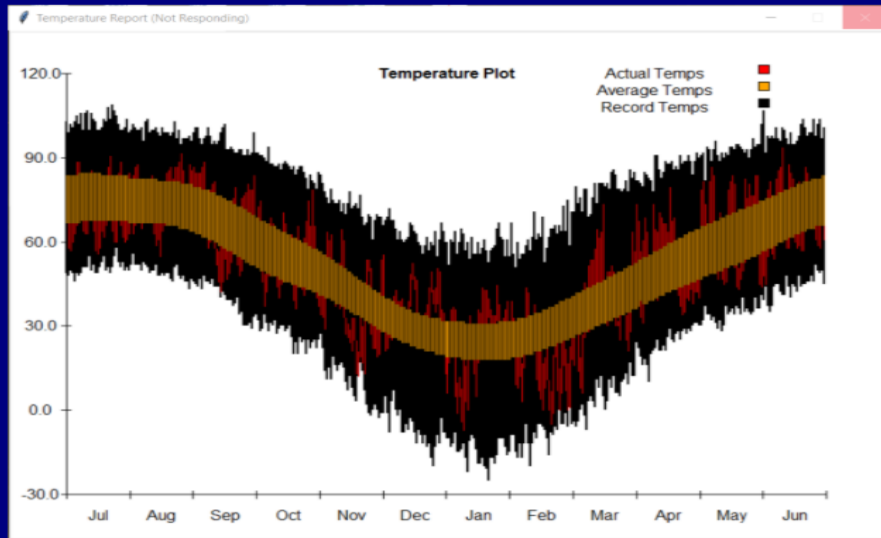
Students' Work: CSI



Students' Work: CSI

Weather Report

This page shows what a HTML page could look like. To get full credit your's will have to be much nicer and have more data!
If you look on the Precipitation plot, you'll notice that the average is so small that it has to be scaled up to even see it.



Students' Work: OOP

Donate to the UNSDGs Today!

Output printed here...

List Donors	Please enter your information: First Name <input type="text"/> Last Name <input type="text"/> Phone No. <input type="text"/> Email <input type="text"/> Home Address <input type="text" value="City, State, Zip"/> Donation <input type="text"/> Gender <input type="radio"/> Female <input type="radio"/> Male <input type="radio"/> Other <input type="button" value="Clear"/> <input type="button" value="Submit"/>
Why Partnerships?	
Visit SDG Website	
Slideshow	
Statistics	
View Graph	

Students' Work: Web Technologies

Welcome to the Online Quiz Center

If you are a first time visitor, please register [here](#)
Or Login here using your username and password.

Login

Password

Login



CS beyond the classrooms

Student Inquiry Research (SIR)

- On campus with IMSA faculty
- Off campus at Northwestern, University of Chicago, Fermilab etc.

Independent Study

- Students work with CS faculty to explore any advanced CS topic

Internships

- IN2 and Talent program work with the students and 1871, Chicago's technology and entrepreneurship center, to place them for summer internships

Extracurricular Clubs and Activities

Our students are encouraged to participate in:

- American Computer Science League <https://www.acsl.org/>
- Cyber Forensics Challenge <https://www.csaw.io/>
- Girls Who Code <https://girlswhocode.com/>
- North American Computational Linguistic Olympiad <https://nacloweb.org/>
- EPOCH – A club run by the students at IMSA focused on Machine Learning and Artificial Intelligence.
- Society of Women Engineers (SWE)- IMSA girls take a deep dive into Computer science and engineering

New technologies, new classes!

- We try to stay on top of the new technologies, like all of you.
- In the past 3 years we have offered 4 new classes
 - Microcontroller Applications
 - Machine Learning
 - Linux and Cyber Security
 - Android Applications

It's easy to say you are going to teach a new course...

- **I haven't used it** - When I worked at Fermilab, I learned the Java programming language 3 times, and promptly forgot it each time because we did all our embedded systems programming in C/C++.
- **It's been a while** – Some knowledge is obsolete (my detailed understanding of the workings of the RS-232 serial port)
- **That's new?** Even something as simple as CSS did not exist when I finished my MS.
- What are we supposed to do to prepare ourselves to teach the new topics.

Prior knowledge to the rescue?

- Yes, it was easier to learn Java the fourth time, and since I'm teaching it, the knowledge has stuck. (although I'm forgetting C/C++!!!)
- A good understanding of CS allows you to more easily learn other CS topics, but you still have to learn the new topic!
 - How much of your summer are you willing to give?
- Can an online course be enough to get you there?
 - Will your school cover the cost?
 - Will it be adequate for your needs?

Some are more difficult than others...

- At what level do we need to understand a topic to teach the topic to our students?
 - A calculus teacher is expected to be proficient at calculus.
 - How can we become proficient in something that was only created last year? What about the techniques that are only months old???
- At IMSA, we have seminar classes. These are usually cutting edge topics that are changing so fast that keeping up would be a full time job.
 - How much can the students teach themselves?
 - Do they even need us?
- Do we need to cut back on the level of our courses???

Future Aspirations...

Our gifted students are hungry for more

- Cloud Computing?
- Game Design and Development?
- More interdisciplinary courses?

Continue to cultivate their curiosity and impress upon them that if they can dream it... they can create it using computer science!

Questions...