Lessons in Effective Security Education

Carolina Zarate
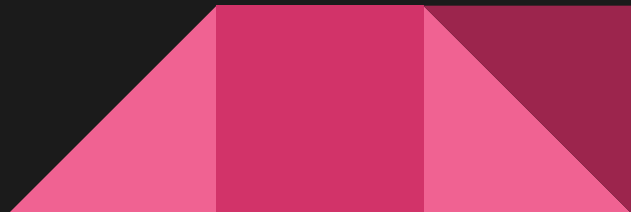**@zaratec4**

Zach Wade
@zwad3

Today's Topics

❖ Self Education

❖ Seminar Education

❖ Classroom Education
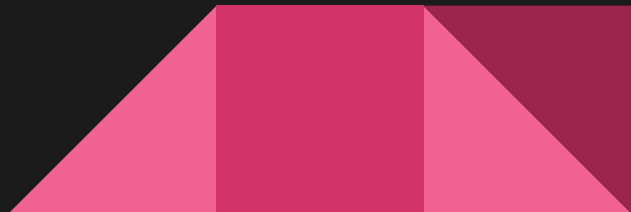
About Us

Carolina Zarate
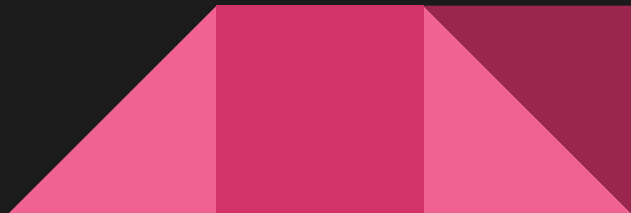
About Us

Zach Wade (left)

Today's Topics

- ❖ Self Education
- ❖ Seminar Education
- ❖ Classroom Education

Motivations

❖ Share what you love

❖ Ensure anyone can participate

   ➢ No one should feel excluded

❖ Encourage people to join teams

❖ Promote security knowledge among the tech community

   ➢ Good hackers make better coders

PicoCTF » Then

PICOCTF PRESENTS
TOASTER WARS

❖ Started in 2012 by PPP

    ➢ Get youth interested in security

    ➢ Make CTF fun for beginners

❖ Surprisingly successful

    ➢ 2,000 teams played

    ➢ Everyone was really excited about it

PicoCTF » Now

- ❖ A collaboration between CMU and PPP

- ❖ PicoCTF 2018
  - ➢ Over 10,000 teams and 66,000 students played
  - ➢ Included in some schools' curriculum

- ❖ Lots of focus on problem design
  - ➢ Plan around relevant skills and concepts
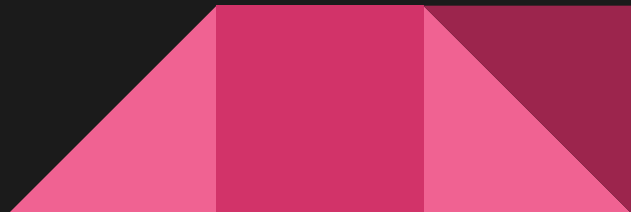 - ➢ Appropriate difficulty range

PicoCTF » Difficulties

❖ A lot of work

❖ Different Expectations

    ➢ Educators

    ➢ Students

    ➢ Available for all

    ➢ Motivated students can grow

PicoCTF » Results

- ❖ People really enjoy it

  - ➢ 85% of students really loved it

- ❖ Introduces students to security

  - ➢ 30% of participants were new to CTF
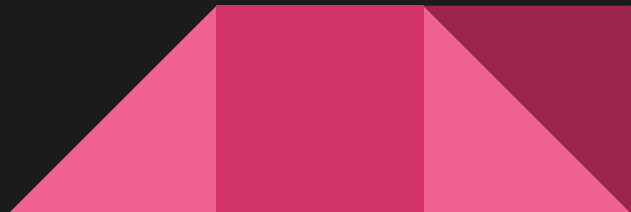
- ❖ Brings people together

  - ➢ 80% played on a team

PicoCTF » Results

- ❖ Encourages youth to pursue security further

  - ➢ 60% of students were more interested in field after playing Pico

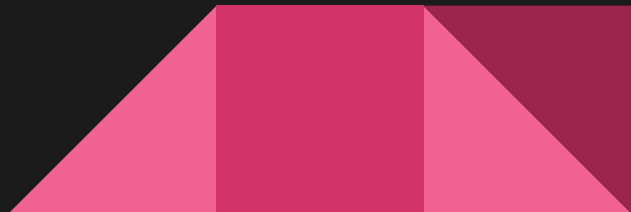- ❖ Some of them join other CTF teams

  - ➢ 👋

PicoCTF » Summary

- Lot of work, with a lot of payoff

- Has a huge impact on new students

- Not feasible for small teams
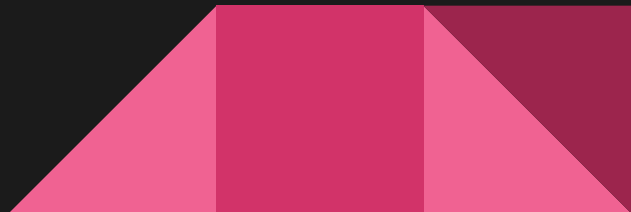
- A labor of love for everyone involved

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MiniCTF » Motivation

- ❖ Introduce students to security and CTF

- ❖ Make CTF accessible to more people

- ❖ Teach people something!
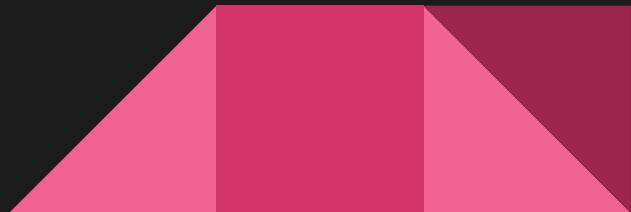
MiniCTF

MiniCTF » Execution

❖ Focused on a single topic

  ➢ Web security and exploitation

❖ Tell and Show

  ➢ Seminar

  ➢ Short (2 hour) CTF
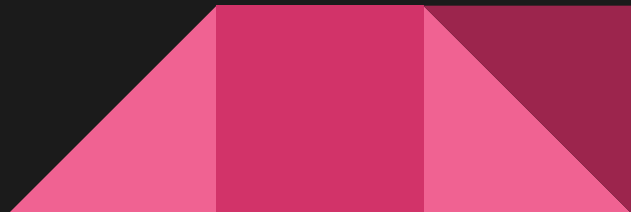
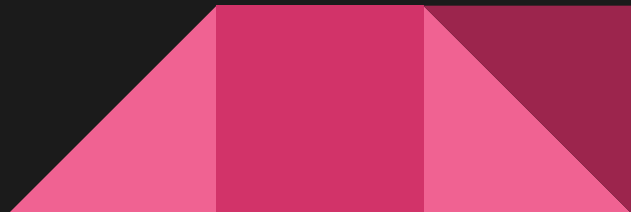# MiniCTF » Challenges

❖ Hard to make challenges for beginners

  ➢ Plan for varied backgrounds

  ➢ Engaging beyond a technical level

  ➢ Keep the underyling concepts simple

  ➢ Err on the easy side
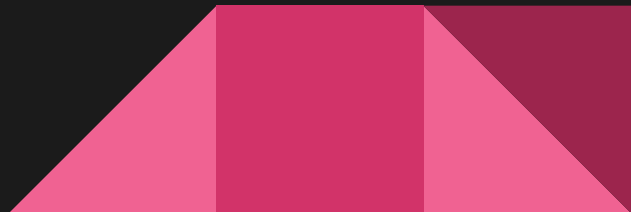
  ➢ Opt for bug-first problem design

MiniCTF » Summary

- ❖ Roughly 40 attendees

- ❖ Overall enjoyment of the event

- ❖ Had several students join the team

- ❖ Students were engaged in the presentation

  - ➢ Interactive components that accompanied the slide

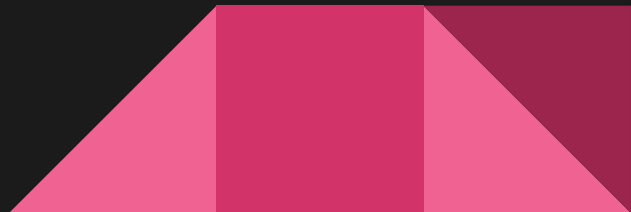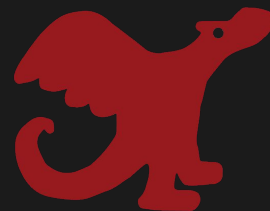 - ➢ Made time for questions

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Academics » Overview

- ❖ Teaching Assistant

- ❖ Helped over 200 students

- ❖ Created interactive assignments

  - ➢ CTF style problems
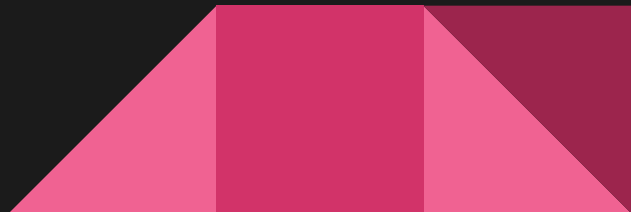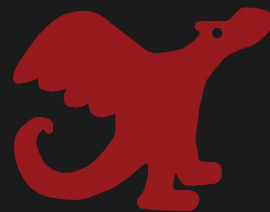
Academics » Differences

❖ Motivation

➢ Self-motivated vs. grade-motivated

❖ Background

➢ Unpredictable skillsets vs. some guaranteed knowledge

❖ Structure

➢ Unstructured vs. organized
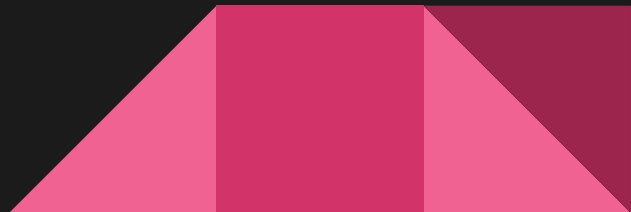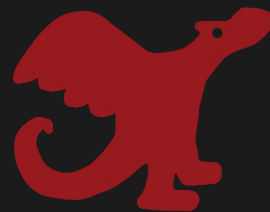
- ❖ **Why** are you stuck?
  - ➢ ¯_(ツ)_/¯
- ❖ Where are you stuck?
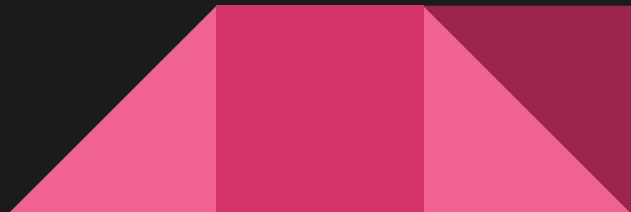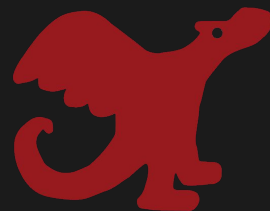- ❖ What do you expect to happen?
- ❖ What is actually happening?
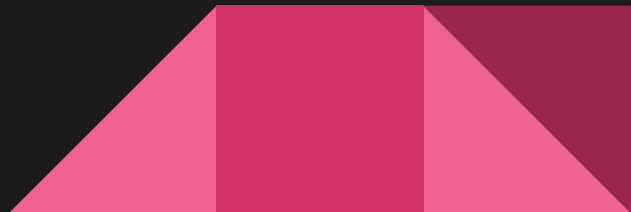 - ➢ Demonstrate this!

Academics » Approaches
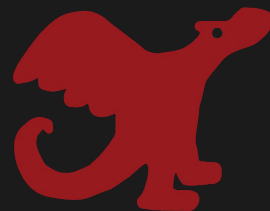
❖ Understand where students are stuck

❖ Focus on helping students understand

➢ Provide structure

➢ Avoid giving solutions

❖ Provide consistent education
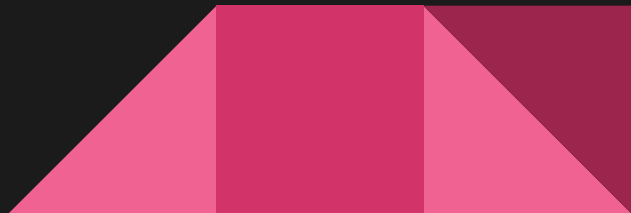
❖ Teach people how to approach problems

    ➢ How to ask a good question

❖ See problems from the players' perspective

    ➢ Helps them avoid mental pitfalls

Conclusion

Know your audience!

Thanks!