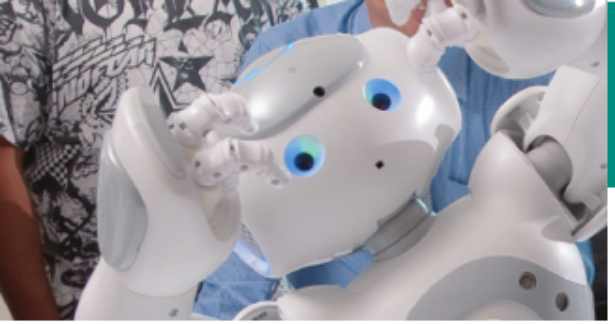
Dr. Melissa Danforth

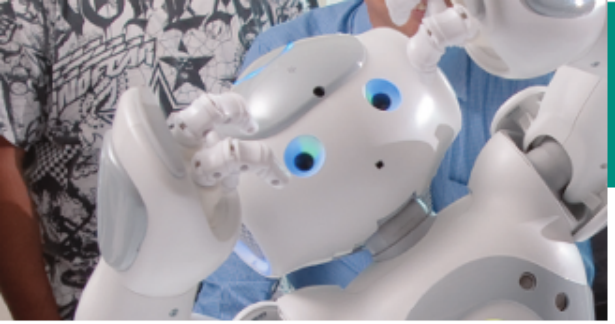
Dr. Charles Lam

Four Week Summer Program in Cyber Security for High School Students



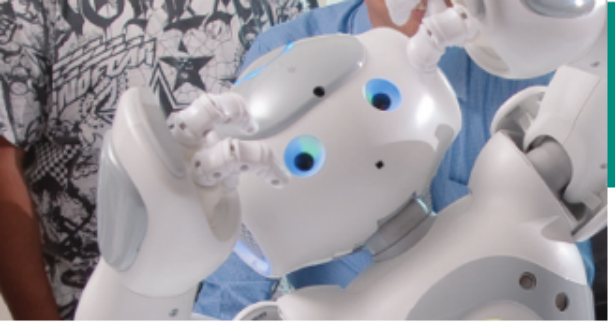
Overview

- Hands-on, intensive program during summer
  - Mid-July to early August
  - Four days each week (Mon. – Thurs.)
  - Six hours each day, including breaks
- Focused on cyber security
  - Cryptography (Charles Lam)
  - Network/Computer Security (Melissa Danforth)



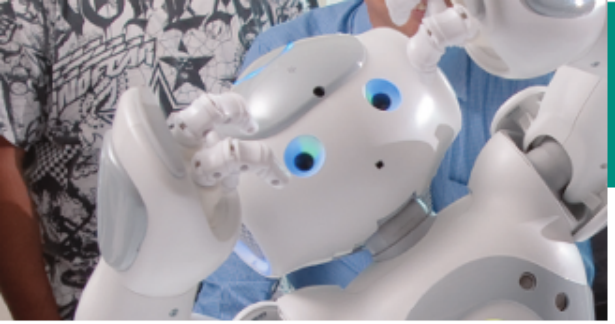
Cryptography Schedule

- Week 1
  - Substitution ciphers, Euclidean algorithm, Modular arithmetic
- Week 2
  - Fermat's Little Theorem, Modular exponentiation algorithm, RSA encryption
- Weeks 3 & 4
  - Work on hands-on project & prepare poster



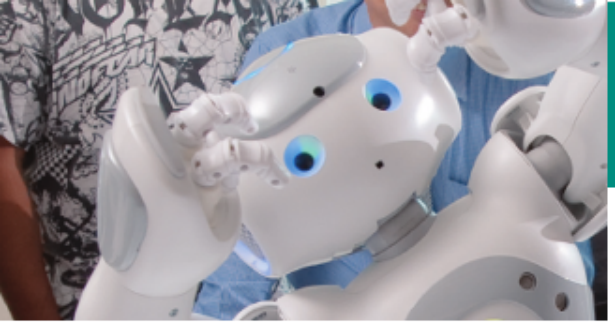
Cryptography Projects

- Students used knowledge gained in first two weeks to develop a project in cryptography
- Students developed three projects
  - Fact-or Fiction (factoring and its effects on RSA)
  - Elliptic Enigma (elliptic curve cryptography)
  - Zero Knowledge, We Know Everything (zero knowledge protocols)



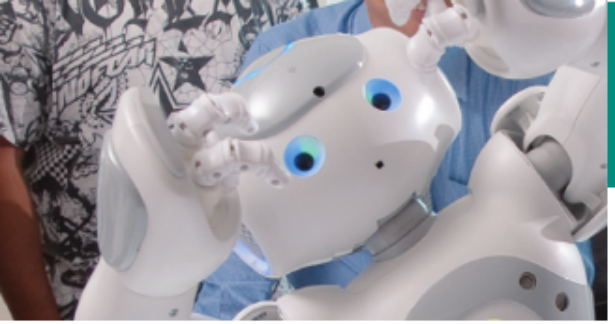
General Security Schedule

- Week 1
  - Ethics and legality (reinforced throughout), security principles, authentication, passwords, password cracking, how to use Linux/CLI
- Week 2
  - Passwords continued, secure authentication, network attacks, social engineering
  - Start projects: primarily in the afternoon



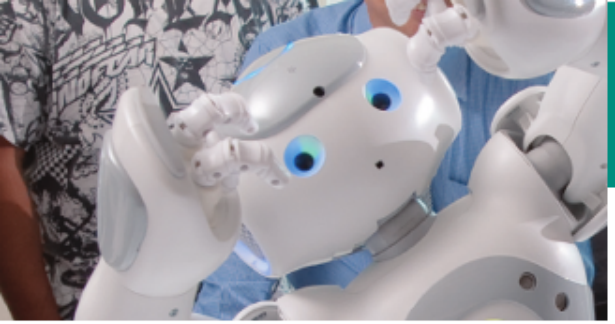
Security Schedule Continued

- Week 3
  - Social engineering continued, malware, access control, protecting information, best practices
  - Continue working on projects
- Week 4
  - Watch videos on recent security topics
  - Prepare posters, print posters, practice for poster competition



General Security Projects

- Students spent the afternoon of Week 2 and most of Week 3 on projects
- Students developed two projects
  - Crack Me if You Can: Using GPU Machines to Crack Passwords
    - Highest placing Mathematics/Engineering/Computer Science poster in the poster competition
  - Defense Against Human Hacking (social engineering)



Conclusion

Lecture notes, presentations, worksheets, activities, and posters are available at

http://www.cs.csub.edu/~melissa/revs-up/

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