CYBERSECURITY C 2026
VASO VERSION

1. **DESCRIPTION:** Competitors will be assessed on their knowledge of cybersecurity through hands-on tasks as well as theoretical questions focused in the areas of cryptography and web architecture.
   A TEAM OF UP TO: 2 **APPROXIMATE TIME:** 50 minutes

2. **EVENT PARAMETERS:**
   a. Each team may bring up to two 8.5" x 11" sheets of paper, which may be in a sheet protector sealed by tape or laminated that may contain information on both sides in any form and from any source without any annotations or labels affixed.
   b. Each team must bring writing utensils and may also bring a mouse.
   c. Teams will bring a computer capable of connecting to a WiFi network and running Python 3 code.

3. **THE COMPETITION:**
   Both Part I and Part II of the event will be provided to the participants at the beginning of the event. Participants may work on both parts simultaneously during the entire event.

   Part I: Written Test (65%)
   a. Participants will complete a written test consisting of the topics Cryptography and Web Architecture, as well as general cybersecurity principles and concepts.
      i. Cryptography
         (1) The cryptographic protocols are limited to:
            (a) The XOR operation
            (b) Classical Cryptography: Substitution Ciphers, Transposition Ciphers
            (c) Modern Cryptography: Block Ciphers, Stream Ciphers, Hashing Algorithms, RSA, Diffie Hellman Key Exchange, Elliptic Curve Cryptography, **Lattice Cryptography**
         (2) Identifying vulnerabilities in implementations of cryptosystems
         (3) Common applications of the topics in the Cryptography section (3.a.i)
         (4) **High-level implications of quantum computing for cryptography**
      ii. Web Architecture
         (1) History of the internet
         (2) Web page construction: HTML, CSS, JavaScript, APIs
         (3) HTTP: requests, responses, headers, query parameters, status codes, verbs
         (4) URL syntax and structure
         (5) Storage, session management, and cookies
         (6) TCP/IP networking
         (7) Common web exploitation techniques
      iii. Principles of Cybersecurity
         (1) Authentication and security best practices
         (2) Cybersecurity ethics
         (3) Online safety

Part II: Hands-On Tasks (35%)

a. The hands-on tasks will consist of multiple programming problems.

b. Competitors will use a browser-based platform to upload their code for grading. This platform requires competitors to connect to a WiFi network provided by the ES. The ES-provided network is not connected to the Internet, and connection to any network other than the provided network during the competition is not allowed.

c. The platform allows participants to write and test code on their own computers and then upload it to the platform, or to write code directly in the browser. Each problem must be solved using Python 3, and only the standard library for this language may be used. The Python 3 documentation will be available within the platform, and documentation, sample code, and notes from the competitors' computers are not permitted. Competitors may use their own Python interpreter, programmer's editor, and/or IDE to prepare their code prior to submission.

d. Competitors will write code to solve a variety of computation problems. Topics may include, but are not limited to:
   i. String manipulation
   ii. Boolean expressions
   iii. Control structures
   iv. Math operations and integer arithmetic
   v. Recursion
   vi. Simple data structures, like built-in lists, tuples, sets, and dictionaries

e. Test cases for programming challenges will be provided to teams to test their program. The problem statement may include time and memory constraints; any given test case will fail if these constraints are not met.

f. Each problem will be checked against the answer and the code submitted. Point values may vary between questions based on difficulty and points given may be determined by the number of test cases passed.

g. Teams will be required to submit their code for each problem through the browser platform.

4. **SCORING:**

a. High score wins.

b. The written portion will account for 65% and the hands-on portion will account for 35% of the total number of available points.

c. In the written portion, points will be awarded based on accuracy of the responses. In the hands-on portion, points will be awarded based on accuracy of outputs.

d. Use of any disallowed networks or resources as outlined in 3.II.b and 3.II.c will result in the team's disqualification from the event.

e. Ties will be broken by 1) Part II score, 2) Selected questions from the written test