



IT-Olympics Venues

There are three venues in the 2009 IT-Olympics competition: cyber defense, robotics, and game design. A student may only compete in one venue during the Olympics. However as part of the IT-Club activities leading up to the Olympics students can collaborate on multiple venues.

A team is comprised of three to ten members. However, we recommend three to six team members which allows everyone on the team an equal change to participate in the events.

Each venue will have three components that the teams will be judged on as described below: community service; the primary competition; the real-time competition. The goals of the competition are to promote interest and exploration of information technology through a fun, unrestricted learning environment that encourages collaboration and experiential learning.

IT-Olympic competition components:

The teams will be judged based on their performance in each of the three components.

20% community service project

50% primary competition

30% real-time competition



Community Service Project:

Each IT-club is required to perform a community service project and produce a poster that details the project to compete in IT-Olympics. The community service project can be targeted at any age group and should be focused on some aspect of IT. A school that is participating in multiple venues can perform one community service project that will count for each venue. Conversely, a school can choose to have one project per venue in which case the scores of each project will be assigned to the corresponding venue. Each IT-Club will need to register its community service project on the web site prior to attending IT-Olympics. The judging of the community service project will be based on several factors.

- 25% project concept (IT relevance)
- 25% creativity in delivering project content
- 25% poster and oral presentation
- 25% project feedback/improvement ideas

Example community service projects include:

- Holding an IT security awareness class for the community
- Arranging for a one day recycling drop off point for used computer and/or other electronics
- Setup a free computer check up day where IT-Club members check computers for spyware and do minor repairs to machines for the community
- Arrange with the school IT support staff to help with computer lab maintenance
- Volunteer to support computers and/or network for the local library

You will be given a table top easel in a 4x4 area to display your poster. There will a scheduled time on Tuesday morning that a team member or members need to be standing beside the poster for the judges to hear the presentation and ask questions about the community service project. This time will be given to each school when the official schedule comes out in approximately February.

Primary Competition:

The primary competition is designed to show the technical abilities of the team. The project that the team has worked on and brought to the competition is what will comprise this portion of the score. Each venue will have different scoring methods and judging criteria which are generally enumerated later in this document.

Real-time Competition:

During the IT-Olympics teams will be asked to solve problems in real-time based on the venue. Because these are real-time problems the actual challenges and details are not

known ahead of time. The problems and the judging criteria are given out during the course of the two-day competition.

Game Design Venue (Primary Competition)

The goal of this venue is to design an educational game that can be used to teach a concept in the areas of Science, Technology, Engineering, or Math (STEM) to students in the grades 6-8, generally considered middle school (junior high) age. The game should be easy to use, fun to play and teach a STEM concept.

Game requirements:

The game program must be created using Alice.

The target age group is students in the grades 6-8.

The concept or issue being taught must be identified in the program.

The game must have on-line help

Team should produce a one page quick start guide to get players and judges started

The code should be documented and will be submitted along with the game

The game will be brought to the competition and made available for judges and guests at the competition to play.

Judging:

25% based on artistic appeal

25% based on educational content

25% based on ease of use

25% based on code and code documentation

Robotics Venue (Primary Competition)

The goal of the robotics venue is to design and program an autonomous robot using Lego Mindstorms NXT to compete in a sumo competition.

A Lego sumo competition is when two autonomous Lego Mindstorms NXT robots try to push or flip each other outside of the circular ring. The first robot to touch the floor outside of the ring loses the bout. While pushing may appear the best way to win the bout, flipping, lifting, and disabling its opponent are effective methods to gain control of the robot in order to push it over the edge.

The competition “mat” is a circular ring is four feet in diameter with a two-inch border. The surface is smooth and raised slightly off the ground.

The robots are placed in the ring 12 inches apart and an equal distance from the center of the ring. The robots are set down parallel to each other and facing opposite directions so they have to search for each other (no steamrolling straight ahead). The referee and onlookers will count 3,2,1 and GO! The team representative will start his robot and then move away from the ring. The robot must wait three seconds before any motion is made to allow the team representatives to clear the circle. Then, the first motion must be forward and has to start within ten seconds of the bout. The robot must find its opponent and then start trying to flip, lift, disable or push it out of the ring.

The combat continues until one robot is disabled or the bout is over (three minutes.) A robot is removed from the ring when any part of it falls off the edge and touches the floor. Hanging on the edge is not considered out. It must touch the floor.

The judgment of the ring official is final. There is no appeal process. If a robot accidentally puts itself over the edge, it is considered a suicide and the opponent is credited with the win.

There will be several rounds to the competition. Each round is three minutes in length or three bouts, whichever is first. If there is no winner at the end of three minutes, the round is considered a draw. The winner of a round is the robot who won the most bouts in that round. The winner of a round gets two points, the loser zero. A draw gives one point to each robot.

If the robots get entangled during a bout and there is wear and tear on the robot, the two team representatives can agree to restart that bout. The clock will stop, the robots will get disentangled and the bout will continue.

More details about Lego sumo competitions can be found at
<http://mindstorms.lego.com/specialevent/default.aspx>
<http://mindstorms.lego.com/specialevent/WhatisLEGOSumo.aspx>
<http://mindstorms.lego.com/specialevent/HowtoPlayLEGOSumo.aspx>
<http://mindstorms.lego.com/specialevent/BeginnerSumo.aspx>

Robot requirements:

The robots must be built using only the components sent to the IT-Adventures Club and must come from kits 979797 and/or 979648. No other components are allowed to be purchased and added in.

The robot cannot exceed two pounds and must fit in a 1' x 1' frame.

Documentation about design choice for the sumo robot must be included for judging. This should include pictures.

Code for the program running during the competition should be documented and submitted to the judges. It will be a .rbt file.

Judging:

30% based on the mechanical design

50% based competition

20% based on code, code documentation and design documentation

Cyber Defense Venue (Primary Competition)

Cyber Defense requirements:

In a cyber defense competition, the high school teams (the Blue Teams) play the role of IT support staff. They configure a network of four computers and provide services to the end users of their network (the Green Team) throughout the event. They also must defend their network for an extended period of time from hackers (the Red Team). In addition to configuring and protecting their network, the Blue Team will be asked to participate in anomalies introduced by the Green Team. By successfully completing each of the tasks they better their score for the competition. The Green Team anomalies and defending from the Red Team attacks comprise the real-time portion of the competition.

The high school teams are provided a scenario of a company and the types of services they are required to run on their networks in a separate document. Generally, they are required to provide domain name service (DNS), email (SMTP and POP/IMAP), file transfer protocol (FTP), remote programming and web services. It generally behooves a team to also install a firewall in their network. Additionally, each team is given an end user machine which has Windows XP or Vista installed on it which they need to configure and support for their Green Team. A complete scenario with full details of the requirements for this year's competition will be available in the participants area on the IT-Adventures web site in January.

Approximately one month prior to coming to campus for this weekend event, the students are given instructions on how to remotely access our research environment to configure their competition network. The team members spend nearly a month installing operating systems from a preboot execution environment (PXE) or from cds. They can choose from a variety of operating systems including Windows and unix/Linux flavors. Additionally a very small number of Macintoshes could be made available on a first come, first served basis to teams requesting them. Each team is given remote access to computers to be configured as servers, firewalls and/or routers for their network and allowed free reign in their installation. They also are given an IP range/ranges that they can use in our virtual Internet environment. A special chat program will also be in place during the remote setup that is specifically for questions and help from the ISU students who are supporting the competition.

Judging:

In a cyber defense competition, a lower score is better. Just think like a game of golf...fewer strokes are better! Each team begins the competition with a zero balance. Demerits are added and subtracted to a team's total score throughout the evening. The team with the fewest demerits at the end of the competition is the winner.

Demerits are given for problems such as services being down, vulnerabilities being exploited, non-completion of an anomaly and non-submittal of documentation.

Teams can remove demerits by completing anomalies and submitting reports to the White Team when their system has been compromised. These reports must detail what happened and what corrective action has been taken to fix the problem.