IEEE Digital Black-Box Competition

Sponsored by the St. Louis Section of IEEE

Date:	Saturday, November 4th, 2017
Location:	Electrical and Computer Engineering Department Emerson Electric Company Hall Campus of Missouri University of Science and Technology (MS&T)
Time:	Check-In at 12:30 pm in the Lobby and contest 1:00 pm - 4:00 pm.
Participants:	Open to all currently-enrolled undergraduates at one of the universities in the St. Louis Section of IEEE. The competition is not open to graduate students! Up to **one** team (maximum of two students on a team) from each school are allowed. (If more teams register, the local IEEE Branch Counselor will certify the official teams.)
Cost:	The competition is free to everyone!
Prizes:	Cash prizes for First ($500), Second ($300), and Third ($200) place will be awarded.
Registration:	Teams must register by emailing taszrc@mst.edu. Please use BLACKBOX as the subject heading. The names of **all** team members must be included along with your school name. Registration must be received by **Friday October 20th (5:00 pm)**.
Food:	Food throughout the competition will be provided.
Judges:	Each participating school is invited to send one judge. The host school will provide one or two judges and the St. Louis IEEE Section will provide a judge.
Contact Info:	Tristan Shatto, taszrc@mst.edu.

Rules and Guidelines for the Competition

1. Students shall participate in teams of one to two students, where every team will be given their own laboratory station. The event duration will be three hours. If more groups register than can be accommodated by a single laboratory, the laboratory spaces will be assigned randomly. The quality of equipment may vary between laboratories, but all students will have access to the same equipment including at minimum: a mixed-signal oscilloscope (Agilent Infinii-Vision MSO-X 2012A), a function generator, a multi-meter, a power supply (may be from development board rather than stand-alone), and a breadboard.
2. Each team will be allowed the use of personal calculators and two bound books of their choice. They may NOT bring outside laboratory equipment, computers/laptops, unbound reference material, etc. Also, no internet access, computer data acquisition, or software resources will be allowed.
3. The circuit will be a HDL design and downloaded to a Terasic DE0-Nano FPGA (Altera Cyclone 4) Development Board. The design will possess between 0 and 4 register stages. The number of digital IOs is limited to 32. Digital pins will be either inputs or outputs; there will be no bi-directional pins. If register clocks are required their position will be specified.
4. The contest coordinator will be last year's winner. All requests, questions, etc. must go through the coordinator. Help related to using the laboratory equipment will be given to the teams, but no help that directly relates to the circuit will be given. Also, hints to all participants may or may not be provided during the competition. This is at the coordinator's discretion.
5. A blue essay book will be supplied each team. The documentation and solutions will consist of only handwritten entries, figures, and data; no printout will be considered. Multiple judges will examine and consider the notebooks only. The winners will be

determined by a number of factors, including the correct answer (or proximity to) AND the documented steps and logical conclusions used to get that answer. Thus, a schematic or HDL description, while necessary, is not sufficient alone.

6. Each judge will rank the teams and award 5 points to first, 4 points to second, 3 points to third, 2 points to fourth, and 1 point to fifth. The points awarded by the judges will be tallied and the winners determined by the scores. Ties will be resolved by a majority vote of the judges.
7. Judges decisions will be by majority vote and will be final in regard to disputes, eligibility, team certification, tie results, and other contest conduct. In particular, cheating will not be tolerated and is grounds for immediate disqualification. Cheating includes disrupting another group, copying another team's work, and collaboration with another group or outside individuals.