

Computer Science Olympiad: Exploring Computer Science Through Competition

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ABSTRACT

Generating interest in specialized areas of Computer Science (CS) is one of the goals of the department of Computer and Information Science at Spelman College as with most departments. Achieving this goal in a new, exciting, and innovative manner provided the inspiration to establish the Spelman College Computer Science Olympiad (SCCSO). The SCCSO is patterned after the Olympics athletic event. Students participate in the SCCSO as a part of a team as with the Olympics, and there are several events for competition that is also reminiscent of the Olympics. The events are designed to expose students to the interesting breadth of CS over several days. In this paper, the events are in the following categories: Cryptography, Robotics, Website Design, Hardware and Software Integration, and Programming. Teams use their CS knowledge and problem-solving skills to complete hands-on exercises in each area. Each team receives points based on the quality of their results from the exercise. In this paper, we present the implementation, results, and future directions of the SCCSO.

Categories and Subject Descriptors

K.3.1 [Computers and Education]: Computer Uses in Education; K.3.2 [Computers and Education]: Computer and Information Science Education

General Terms

Algorithms, Design, Experimentation, Security, Languages, Retention, Competition, Olympiad

Keywords

Computer Science Education, Computer Programming, Robotics, Hardware, Software, World Wide Web, Competition, Olympiad.

1. INTRODUCTION

There have been academic contests throughout the years with science fairs, math teams, debate teams, and computer programming contests[1]. These contests are extracurricular activities that allow students to take their knowledge and understanding from the classroom and apply it within a competitive environment. These types of activities provide ways of challenging students in creative and innovative ways. They also help students develop the skills for effective teamwork. And most

of all, we find competition to be fun and challenging at the same time.

The SCCSO was developed to meet the needs of students in several ways. First, we wanted to expose the students to the breadth of Computer Science in a hands-on way. Second, we wanted our students to practice working on a team with a hard deadline to solve a problem. Finally, we wanted our students to practice for ACM International Collegiate Programming Contest[1]. All of these factors led to the development of a 2-3 day experience for students where they compete in several CS-based events in teams to achieve the most points and to become the champion. Our events utilize several hardware and software platforms as well as pencil and paper across several areas within CS. Currently, we have the following areas:

- Computer programming using a high-level programming language (C++, Java).
- Robotics using the Lego Mindstorms® robotics kits[2].
- Web Page design using Microsoft Frontpage® or Adobe Dreamweaver®.
- Cryptography using cipher wheels and cryptanalysis.
- Hardware/Software integration using a Jeopardy® style presentation of CS1-CS3 topics.

These areas were chosen in consideration of the interests of the department students and faculty. This paper presents the SCCSO as a framework that can be customized to the needs of a given institution.

Our experience with the SCCSO has been very gratifying for the students and the faculty involved. Students work on projects that they may have never been exposed to and sometimes the SCCSO is the only exposure to the topic. Our results indicate the success of the SCCSO by noting the schools who continue to participate each year, and the results of our surveys of participants also shows the SCCSO's success.

In Section 2 details the implementation of the SCCSO to serve as a roadmap for other organizations wishing to start an Olympiad at their institution. Section 3 discusses our evaluation process and results and how they support the need for the SCCSO. Finally, we end with a discussion about the current state of the SCCSO, the lessons learned, and the future of Computer Science Olympiads.

2. Implementation of the SCCSO

In this section we provide the details for implementing the SCCSO that are applicable to implementing an Olympiad at other institutions. In this section we present the strategy for team formation, descriptions and example problems for events, a complete two-day Olympiad schedule, publicity and sponsorship challenges, and finally how the whole department of students can play a significant role in the Olympiad even without competing on a team.

2.1 Team Formation

One or more faculty or staff members coach Olympiad teams. Each team consists of 3-4 students. At least one team member must be a female student. One of our sub-objectives for the Olympiad is to address the shortage of women participating in CS departmental activities, and the level of isolation they tend to feel within the CS discipline. This requirement ensures that women are included in the Olympiad from all schools and may indirectly alert a department to this sensitivity. We also encourage teams to have two compositions according to their year in school:

1. Teams composed of Juniors and Seniors
2. Teams composed of Freshman and Sophomores

Our rationale is to allow students to work within their peer-group to facilitate more efficient team working practices. We feel that if teams are composed of mature and less mature students that there will be the possibility of younger students feeling intimidated or hesitant about providing input to solving the problem. In addition, older students will feel the burden of having to tutor younger students during competition.

2.2 The Events

The events for the Olympiad may vary from year to year in terms of type and content of the competitions. Over the years, we have tried six different events and in this section we provide a description of those events as well as our evaluation of the events based on our experiences. Finally, we discuss a few event ideas that have yet to be implemented, but we are preparing to implement in future Olympiads.

2.2.1 Cryptography Event

Description

The Cryptography Event is designed to introduce students to cryptography using basic cryptanalysis techniques. The event starts by giving the teams several secret codes. The secret codes are typically clues to a puzzle. The teams aim to decipher the secret code in shortest time possible and within the allotted time period. The event is designed for students with no prior course or knowledge of cryptography.

Example

Teams are given 5 secret codes to decipher. Each question will

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have instructions to assist the teams in finding a solution. For example:

Cryptogram #1

Recover the original quote from the encrypted quote. Each letter in the original (plain text) quote has been replaced with a letter from the cipher; for example, every 'A' in the original quote may be a 'C'. In that case, to decode the encryption, an 'A' would be used in place of a 'C' to recover the "plain text" and reveal the original quote.

Encrypted Quote:

QLGXJVERWVEILGB! YLR CVDS BRQSBTRWWY
QLAKWSESZ VG LWYAKIVZ QJYKELXJVA.

Plain Text Quote:

CONGRATULATIONS! YOU HAVE SUCCESSFULLY
COMPLETED AN OLYMPIAD CRYPTOGRAM.

Evaluation Criteria

The teams are judged on their time to solution and their accuracy. The team with the fastest and accurate solution wins. Points are deducted for any inaccuracies.

2.2.2 Programming Event

Description

The programming event is based on the traditional ACM Programming Contest format. Teams are given a set of problems to solve through coding. Teams are allowed to use either C++ or Java and are allocated one machine. When a team solves a problem correctly they submit their solution for judging. The judges reward correct solutions with a balloon and incorrect solutions are returned with feedback that tells the team what area of the solution they should concentrate on to reach a correct solution.

Our event differs from the ACM contest in that we provide problems that are solvable by students who have only completed CS1 or CS2 along with problems for students who have had non-linear data structures and analysis of algorithms courses. This allows the freshman and sophomores to compete in a meaningful way.

Example

The programming challenges in this event range from problems for students who have completed a first programming course (level 1) up to students nearing the end of their undergraduate program (level 3). Below are examples to illustrate the levels of difficulty:

Level 1 (Freshman): Write a program that must read a set of student records from a file, display the list sorted by last name in alphabetical and reverse alphabetical order; display the students with the top 3 GPAs. Requires arrays of records and basic algorithms.

Level 2 (Sophomore): Write a program that reads in a sequence of airline reservations and find seating on the aircraft, where groups must be seated together. Requires arrays of records and modified intermediate searching and data management operations.

Level 3 (Junior/Senior): Write a program that given a map of a city can determine that if some roads are flooded can you still reach every building in the city from every other building. Requires graph representation and graph traversal algorithms.

Evaluation

The evaluation process is similar to the process used at the ACM Programming contests. Programs are expected to compile to be evaluated and they are evaluated based on the accuracy of the output content and format.

2.2.3 Robotics Event

Description

The Robotics Event introduces students to the basics of robotics-based problem solving. We use the Lego MindStorms® robotics kits as the platform for this event. Teams are required to build a robot and have it complete a given a set of tasks. The team that builds a Robot that correctly completes the highest scoring tasks during the allotted time period wins.

Example

Each team is asked to build a robotic with 180 degree range of motion vertically and horizontally. The arm has a claw for grasping objects. The objective is to place 2 ball stands to the left and right of the arm. The arm must move blue balls from the left stand to the right stand, and if the ball is any other color is should leave it on the stand.

Evaluation

The robot is judged on its construction and design, and it is judged on how well it has been programmed. The efficiency of the programming can be determined by the amount of time it takes to complete the task, the number of unnecessary movements, and the accuracy of the algorithms used. In addition, students are evaluated on their oral communication skills when presenting their robot's abilities to the judges and answering the judges questions regarding the building, programming, and testing process used by the students.

2.2.4 Web Page Design Event

Description

The Website Design Event is where the teams are given a theme upon which they are to design and create a unique website using Frontpage or Dreamweaver. All teams are given the same specifications. They are allowed to use up to 2 computers to build the site. This allows them to use one computer for authoring and one for obtaining assets in terms of pictures, videos, sounds, etc.

Example

Objective: Redesign the Spelman College Computer Science Olympiad web site.

Overview: The Spelman college Computer Science web site re-design should be visually attractive and user friendly. Be cognizant of color choice, overpowering graphics and background, and design layout. Only HTML and JavaScript coding can be used. Web design software applications and sites (i.e. Front Page, Hometown, Dreamweaver) cannot be used.

Re-design Requirements: Your re-design must have the following:

1. Three (3) new original pages
2. One (1) graphic related to each of the five (5) Olympiad events
3. Three (3) hyperlinks to other Internet web sites.
4. Two (2) hyperlinks to pages within the re-designed web site.

5. One (1) page describing your Olympiad experience
6. One (1) contact page for your Olympiad team coach: name, address, phone, fax, email.
7. All of the current Olympiad web site information.
8. Page navigation frame on the left side.
9. Use the Olympiad logo on the index page.
10. Site visit counter on the index page.

Procedure:

1. Access the current Spelman College Computer Science Olympiad web site on the Internet
2. Re-design the web site meeting all of the listed Re-design requirements.
3. Save your re-design website onto the Zip disk provided. Only the website on the submitted Zip disk will be graded.

Evaluation

The websites are evaluated based on the creativity used in addressing the theme, the adherence to the theme in the design and selection off assets, and the functionality and usability of the website.

2.2.5 Hardware/Software Integration Hands-On

Description

The Hands-on Hardware/Software Integration Event gives students the opportunity to install hardware and software on a PC and configure the machine to handle a particular set of tasks. Each team is given a set of tasks to complete using both computer hardware and software. These tasks may be to upgrade the RAM, install a new hard drive, and a network card. Next, they are asked to install a fresh installation of Windows XP and configure the networking to work on the local area network. Finally, they have to download and install some set of applications and test the installations for correctness.

Example

Each team is provide with a system unit and a monitor. The system unit is missing its hard drive, network interface card, RAM, and CD/DVD drive.

The teams are asked to complete the following:

1. Complete the assembly of their system unit and test the assembly using the BIOS.
2. Install a fresh copy of the Windows XP
3. Install the MS Office suite along with FrontPage
4. Configure network support for the machine with a static IP address
5. Download and install the Lego Mindstorms Robotics software
6. Configure the machine to work with the Lego Mindstorms robot

The machine is then used by the teams to compete in the robotics competition.

Evaluation

Each system is tested by the judges to ensure that the hardware is installed an running properly. This is typically done by viewing

the BIOS configuration and the “My Computer” properties. In addition, the software downloads are tested for correctness and completeness. Teams are ranked according to completion time if all tasks are completely completed, or a modified time is generated by adding time for each incomplete task for teams that did not complete all tasks.

2.2.6 Hardware/Software Integration Quiz Bowl

Description

Due to the cost of repairing damaged machines and other logistics due to space and time requirements we devised a quiz bowl event for hardware/software integration. The quiz bowl is team-based where the questions are given and the team with the first correct answer obtains points. The questions revolve around the operation and terminology of various hardware components that would be discussed in computer organization type course, technology questions that may be encountered outside of courses or during internships, system-level and application-level software questions that may come from programming languages, operating systems, database, graphics, networks, etc courses as well as from practical experiences with installing and configuring software on Windows and Unix based systems.

Example

Category: INTERNET

Q - The Internet has its roots in a networking project started by what Pentagon agency, as a part of the U.S. Department of Defense.

A - Advanced Research Projects Agency, ARPA

Category: INPUTOUTPUT

Q - A type of non-impact printer that forms characters and graphics by spraying tiny drops of liquid ink onto a piece of paper.

A - ink-jet printer

Evaluation

The team with the highest total of points wins this event. Judges are used to make judgments on ambiguous answers or answers that are not exactly the same as the intended answer.

2.3 A Typical Schedule of Events

The Olympiad is implemented as a 2 day event. This allows us to comfortably fit the activities on a weekend and allow for travel time for participants. We typically start the Olympiad on a Friday evening and it will continue through Saturday evening as shown in Table 1. This allows schools to travel Friday morning or afternoon to arrive at the location and to have all of Sunday to return home.

Time (Day #1)	Activity
3:00 pm – 5:00 pm	Registration
5:00 pm – 6:00 pm	Opening Session
6:30 pm – 7:30 pm	Cryptography Event
8:00 pm – 10:00 pm	Web Design Event
Time (Day #2)	Activity
7:30 am – 8:30 am	Breakfast
9:00 am – 12:00 pm	Programming & Robotics Events (Heat I)
12:15 pm – 1:15 pm	Lunch

1:30 pm – 4:30 pm	Programming & Robotics Events (Heat II)
5:00 pm – 6:30 pm	Hardware Software Integration Event
7:00 pm – 9:00 pm	Closing Banquet and Awards Ceremony

Table 1. Olympiad schedule template for a 2-day Olympiad which includes 5 events, meals, and awards ceremony.

You will notice that Robotics and Programming events seem to be combined in the schedule. This is due to the fact that both events occur at the same time. Each team is either in Robotics Event (Heat I) and Programming Event (Heat II), or they are in Programming Event (Heat I) and Robotics Event (Heat II). This format allows us to scale our Olympiad over limited machine and space resources. We are unable to do this for the Cryptography, Web Design, and HW/SW Integration Events because of the difference in the time requirements and the need to have teams directly competing with all other teams in head-to-head fashion.

You will notice that the schedule has built-in 30 minute gaps between activities. This is due to the fact that our Olympiad typically requires the use of several buildings on campus for large meeting rooms, dining, and laboratory needs. This should be customized for your needs.

Also notice that the first event does not start until the early evening on the first day. This is by design to allow traveling teams some flexibility in arriving to minimize impact on the class schedules of visiting institutions.

This subsection summarizes the key details in our two-day Olympiad schedule and offers suggestions that may help other institutions organize an Olympiad. In the next section, we will discuss our approach to publicity and sponsorships.

2.4 Publicity and Sponsorships

Publicity begins during the current Olympiad. Your best audience for next year is the current participants and their faculty coaches. At the end of each Olympiad we invite everyone back next year, and announce the location of the Regional Olympiad for the upcoming fall semester.

Sponsorships are best solicited in the Fall semester preceding the Olympiad. We have been most successful with companies that routinely recruit our students, and those with graduates on staff. Send an introductory letter describing the Olympiad and then follow-up in a week with a phone call and email. We utilize our graduates for solicitation of their own company, and enlist the assistance of our Career Placement center personnel for the names and contacts of companies that may be interested in the opportunity to have access to some of the top Computer Science and Engineering students (especially female).

2.5 Involving the Whole Department

The Olympiad is a student-centered competition event; however, there are some students that do not have an interest in competing. We have exposed some of these students to Olympiad competition and the CS content by giving them the opportunity to design and implement the events along with the faculty.

Each event is headed by a faculty member, who will typically work with 2 or more students to create and implement the event. Events require some background research and/or exploratory search to determine the types of problems which could be considered for the competition. For example, several

programming problems from CS courses around the world and the ACM programming contest are consulted to help create a set of suitable programming problems for the Olympiad programming event. The students are the integral part in locating and evaluating the problems that are located. Then they are involved with developing the set of problems that will be given to the participants in competition. In addition, students are involved with programming solutions to the problems and developing a test-suite for evaluating submissions from the competing teams. Finally, the students act as liaisons between the judges in the competition and the participants in the competition.

A student that does not participate in the competitive aspect of the competition can still be exposed to the team aspect of solving problems, the CS content of the events, etc by playing a major role in the creation of the events.

3. Results from Participants

In this section, we provide a demographic profile of SCCSO participants from 2003-2007. After presenting this profiles, we present results based on surveys and event evaluations. The results of these surveys are both quantitative and qualitative.

3.1 The Demographics of the Participants

Participant	Olympiad Yrs	Grand Champion
Spelman College	2003-07	2005, 2006
Morehouse College	2003-07	2003
Clark Atlanta Univ.	2003-07	2004
NC A&T Sate Univ.	2003-07	
Voorhees College	2004-07	
Norfolk State Univ.	2004-07	2007
Duke University	2005-2007	
Hampton University	2006-07	2006 Regional
Winston Salem State	2006-07	
Florida A&M Univ.	2003-04, 2007	
Tuskegee University	2004	

Table 2. The list of SCCSO participating schools from 2003-2007. This data includes one year of regional SCCSO events.

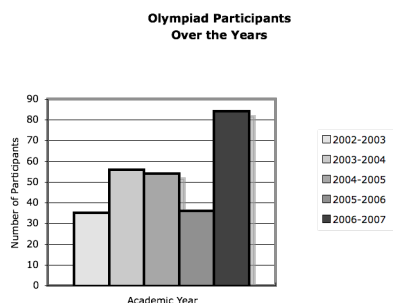


Figure 1. Graph shows the participation levels of schools between 2003-2007. In 2006-2007, the reduction is due to unavailable funds for schools to travel.

This section provides a profile of the demographics of the participating schools and the participants. From 2003-2007, we have primarily serviced HBCU institutions. Table 2 lists the schools involved with the Olympiad and shows that 90% of the schools are HBCUs. Each of these schools had at least one team of 4 students participating each year. The teams are either Freshman-Sophomore or Junior-Senior teams. We have had a total of 265 students and on average 17% Freshmen, 27% Sophomores, 38% Juniors, and 17% Seniors participating each year. Figure 1 shows the number of participants in SCCSO events between 2003-2007. The reduction in 2006 is a result of various schools not having available travel funds for their teams. This result along with our desire to expand the SCCSO concept motivated us to seek funding from the NSF BPC program. The funding obtained from our NSF BPC grant provided funds for teams that place at regional SCCSO events to travel to Atlanta for the overall championship. Regional Olympiads reduce the cost of travel for teams because of the closer proximity, and then travel expenses to the championship are made possible through the grant. This resulted in a 40% increase in participation from our previous peek year and more than doubled the participation of 2006. In an effort to address the shortage of women in Computer Science we stipulate that each team must be composed of at least one female student. As a result 42% of the participants are women and 58% are men. Finally, minority students have been 100% of the student participants with 98% African-American, and 2% Latino and East Indian. In the next subsection, we discuss the results of our SCCSO participant evaluations.

3.2 Impact of the SCCSO on Participants

Statements from Survey Analysis	Percentage of Students Supporting the Statement
Olympiad activities were meaningful and relevant to needs of the students	87%
Participation in the Olympiad was a worthwhile experience	96%
The Olympiad increased your interest in computer science	73%
Olympiad related to Computer Science classroom learning and knowledge	85%

Table 3. Shows statements derived from SCCSO evaluation forms completed by all participants. The percentage of participants that supported these statements is shown in the second column of the table.

At the conclusion of each SCCSO, we have given an evaluation to each participant. We have used this evaluation to justify the need for the SCCSO for support from corporate sponsors and from funding agencies such as the NSF. We have placed an example of our evaluation form in Appendix A. The results in Table 3 shows that students strongly agree that the activities in the SCCSO are meaningful, relevant, and worthwhile. In addition, students are motivated to learn more about Computer Science after

participating. These results suggest that students are much more likely to stay in Computer Science.

The free response section of our evaluation provided many anecdotal results including students expressing that “I enjoyed the programming I’ve learned several new tactics.” and the SCCSO “Gave me an opportunity to apply my skills outside of the classroom”. Participants felt that the SCCSO was beneficial to them because it allowed them to develop team-working skills saying “(I enjoyed) Competing with peers; networking, working in a team” and “Working together with students at other schools with common interest”. Also students expressed strong interest in continuing to learn about areas they were exposed to by stating “It was my introduction into Robotics, I love it! I’ll be working on it from now on.”.

It is clear from the evaluation that students are excited about the SCCSO experience and motivated to continue to work in Computer Science. This is a very important aspect to improving retention in the major. We realize that a more comprehensive evaluation process would be required to make absolute claims about the broader-impact long-term effectiveness of the SCCSO. At present, we hope to have the opportunity to develop such a study as SCCSO events are implemented at various schools with a wider variety of student backgrounds and demographics.

4. Conclusions

The students and faculty participate in the Olympiad because of the exposure to various CS topics and the excitement generated by competition. The students find the Olympiad experience very engaging and exciting as well as a learning experience. The diverse nature of the events provides an alternative or extension of traditional programming contests. It allows students that are not strong programmers to apply their problem-solving skills to other areas of Computer Science. We feel that the diversity of events will have greater appeal to a larger number of CS students. The SCCSO format is a modular format that allows individual hosting sites to tailor it to the strengths and interests of the department and the school. Events could be created that involve computer graphics, multimedia, bioinformatics, and many others. The SCCSO can be used as one of many strategies to increase retention although we have not tracked this aspect. Our contention is that students that are excited about their major tend to stay and work hard in the major. Many of the participating faculty coaches have supported this opinion by stating that their students “look forward to the next Olympiad” each year. We are currently exploring ways to use the SCCSO as a strategy for broadening participation in Computing. As a result, we have partnered with a local public school system and are devising plans to extend the SCCSO concept into the middle school and high school levels. We are using our experiences with our middle school and high school summer camps and workshops as the basis for the developing these events.

5. ACKNOWLEDGMENTS

Our thanks to the entire Spelman College faculty for their continued support of the SCCSO. In addition, we would like to thank our sponsors for their monetary and awards contributions: Unysis, Microsoft, Morgan Stanley, and Google.

6. REFERENCES

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Appendix A: Sample Evaluation Forms



Spelman College
C.A.R.E.: Computer and Robotics Education for African American Students
PRESENTS
Spring 2006 Computer Science Olympiad
Date: Friday, March 31 - Saturday, April 1, 2006

Mark the appropriate box to indicate your affiliation (Please select only one choice)	<input type="checkbox"/> Spelman Faculty	<input type="checkbox"/> Spelman Staff	<input type="checkbox"/> Spelman Student	<input type="checkbox"/> Judge	
	<input type="checkbox"/> Corporate Sponsor	<input type="checkbox"/> Visiting Faculty	<input type="checkbox"/> Visiting Student	<input type="checkbox"/> Visitor	
Check the appropriate Classification (Please select only one choice)	<input type="checkbox"/> Freshman	<input type="checkbox"/> Sophomore	<input type="checkbox"/> Junior	<input type="checkbox"/> Senior	<input type="checkbox"/> Graduate

Section I. Please rate the following on a scale of 1 through 5 (1 indicates strong agreement with the statement; 5 indicates strong disagreement with the statement).

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Overall, participation in Olympiad was a worthwhile experience.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The event was well organized.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Olympiad activities were meaningful and relevant to my needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I enjoyed my experience and would be willing to participate again.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Opportunity to network and share ideas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Balance between presentations, discussion and interaction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section II. Please respond to each question by marking Yes or No.

	Yes	No	NA
7. Did Olympiad impact your interest in Computer Science?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Did you have any Computer Science courses in high school ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Did Olympiad relate to any Computer Science classroom learning and knowledge?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Did Olympiad influence an interest in Computer Science Research?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If Yes, Please explain your Research Interest or Involvement in Computer Science.

Section III. Please rate each item as excellent, good, fair, or poor by marking the appropriate box.

	Excellent	Good	Fair	Poor	NA
11. Was Olympiad information and communications (invitations, schedules, directions, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Event One: Cryptography	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Event Two: Web Site Design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Event Three: Programming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Event Four: Robotics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Event Five: Hardware & Software Integration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Day One: Opening Ceremony	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Day Two: Award Ceremony	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. What would was the most beneficial part of the Spelman College Computer Science Olympiad?

20. What would you change/improve about the Spelman College Computer Science Olympiad?

Additional Comments: