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Final Report
Summer Intern Program
June/July '92

W. Appelbe

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Summary

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This report summarizes the summer internship program conducted this summer, supported by an ONR grant (N00014-92-J-1828, Georgia Tech budget C-36-542). The report describes the work undertaken by the students, results of the program, and future plans. Overall, the internship program was a complete success. Every one of the six students in the program completed a significant research project under supervision of a faculty member and rated their experience highly. Three of the students have continued to work on research projects within the College during the Fall quarter. We plan to run a similar program again next summer, with perhaps a dozen students and more forward planning and recruitment. We propose to use the excess funds as seed money for this program.

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Statement A per Andre Van Tilborg
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 Arlington, VA 22217-5000
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1 Program Organization

The original goal of the summer internship program was:

“ The goal of the internship program is to give minority undergraduate students an introduction to what graduate study in Computer Science is like, to encourage them to consider graduate education. A further goal is to build stronger relationships with local four year HBCUs (Historically Black Colleges and Universities).”

To accomplish this we organized an eight week program, consisting of:

- A research project.
- A series of seminars by different faculty on their research areas, partly modeled on our course “Introduction to Graduate Studies in Computer Science” that all incoming graduate students are required to take.
- Short courses, run in conjunction with the College of Computing Continuing Education staff, on topics such as UNIX and C.

We recruited students through the active cooperation of faculty at local HBCUs (including Spellman College, Clark-Atlanta University, and Morris Brown College). The active participation, suggestions, and guidance of these faculty was a key in planning the program, advertising, recruiting, and evaluating applications from students.

The first week that students were in the program was used for orientation: familiarizing them with the college and campus, showing them how to use UNIX tools such as mail, and, most importantly, matching each of them with a research project and advisor.

The research projects were the major component of the program; they are discussed below. The seminars were quite successful, as they exposed students to a broad range of research interests and challenges and were relatively easy to organize. We conducted the short courses by allowing students to enroll on a no-fee basis in continuing education courses that were appropriate for them, given their preparation and needs. Most students enrolled in a couple of two or three day courses.

Another important aspect of the program was continuous mentoring. For the first two weeks, all students met on a daily basis to discuss any problems they were having, and so forth. Later we met two or three times a week to

review progress, and students were asked to produce progress reports and present their research. Students met regularly with their project advisors and other graduate students.

2 Research projects

We solicited research projects from all the faculty. The guidelines for such projects were:

- Have a research component (not just “programming”, for example).
- Doable by an undergraduate without specialized skills that would require a graduate course to master
- Able to reach closure in about 8 weeks of full-time work

We had about 6 projects that met our guidelines. Students listened to presentations of all the projects, then discussed the details of projects they were interested in in more detail individually with the faculty sponsoring the project. The following table lists the projects undertaken by each one of the students, the faculty sponsoring the project, and title:

Student	Faculty Advisor	Project
Jastasis Thomas	Navathe (DataBases)	Goose: A Graphical Interface for an Object-Oriented Database
Maurice Dennard	Arkin (Robotics)	Multiagent Robot Navigation and Transferring Data Across the Network
Delano Glanville	Stasko (Visualization)	Visualization and Animation of Parallel Programs
Dwight Huggett	Shackelford (CAI)	Optimus: A Teaching Environment
Jelyne Martin and Natalie Nelson	Ashwin Ram (AI)	Tale-Spin: A Story Generation Environment

3 Evaluation

The success of the program warrants making it an annual activity, with a little “fine-tuning” needed for '93 to improve and streamline the program. These

changes are based partly upon the intern's own evaluations of the program (included in an Appendix). Following are a list of recommendations for next year:

- Commence recruiting students in early Winter Quarter
- Have the orientation week separate from the 8 weeks of the regular internship (effectively start the program a week early. The duration of the program, 8 weeks, and overlap with the end of Tech's spring quarter, worked well (the HBCUs are on semesters). Students had the option of continuing work on their projects in August or taking a vacation.
- Increase enrollment to a maximum of 12 students.

Since we had only 6 students the program was very personalized and informal. This undoubtedly contributed to the success of the program. We could expand the program to about 12 students without losing this atmosphere. Increasing enrollment would somewhat complicate coordination of projects, and would probably require funding for continuing education courses specifically for the interns.

Appendix A – Budget

C-36-542

Category		Original Budget	Encumbered	Expended	Free Bal.
Materials & supply		\$22,560.00	\$0.00	\$15,723.00	\$6,837.00
Computer Chgs.		\$1,300.00	\$0.00	\$1,300.00	\$0.00
Total Direct		\$23,860.00	\$0.00	\$17,023.00	\$6,837.00
Indirect Chgs		\$1,032.00	\$0.00	\$1,284.00	(\$252.00)
Total		\$24,892.00	\$0.00	\$18,307.00	\$6,585.00

Appendix B – Program Evaluations

The following evaluations are self-explanatory. After the program was over we asked each intern to rate the program (to what extent were their expectations fulfilled; their interactions with staff, students, and faculty; and suggestions for improvements). Two of the answers are hard-copy, the rest are electronic submissions (The interns soon discovered that E-mail was the “lingua franca” in the College).

Name: Maurice L. Dennard

What did you expect to get out of the summer internship (e.g.; new skills, some idea of what grad school is like, money)?

I expected to learn something about robotics, using the UNIX system, and to refresh my knowledge of C Language.

To what extent were your expectations fulfilled (completely, partially, not at all) and why?

They were filled partially because there are still some things that I would like to know as far as operating the UNIX is concerned. I also would like to have some more experience in using remote procedure calls.

Were there any unexpected benefits

(that is, things that you got out of the internship, or happened, that you enjoyed, but did not anticipate)?

I did not expect to receive my housing payment back for my dorm room, and I also didn't expect to be considered part of the AAAI robotics team.

How would you rate your interactions with:

Staff (such as vicky) Good
Other graduate students you met Excellent
Coordinators (Bill and Kevin) Excellent
Your faculty project advisor Good

Were they helpful, available, inspirational, etc.

They were quite helpful and gave very good advise when I became frustrated.

What suggestions do you have for improving the program (e.g., additional activities, when and for how long the internships should be scheduled)?

The orientation week should not be considered as one of the eight weeks of the internship. That would give the students more time to work on and finish the project.

Would you recommend the program to other students at your college?

Yes. I would recommend it because it is a good learning experience that can help one decide what he wants to do in the computer science field.

From bill@prism.gatech.edu Wed Jul 29 15:45:02 1992

Return-Path: <bill@prism.gatech.edu>

Received: from burdell.cc.gatech.edu by terminus.cc.gatech.edu (4.1/SMI-4.1)
id AA00675; Wed, 29 Jul 92 15:44:59 EDT

Received: from hydra.gatech.edu (hydra-rich.gatech.edu) by burdell.cc.gatech.edu (4.1/SMI-4.1)
id AA07482; for del296@terminus.cc.gatech.edu; Wed, 29 Jul 92 15:44:58 EDT

Received: by hydra.gatech.edu (5.61/3.1)

id AA07601; Wed, 29 Jul 92 15:44:56 -0400

Date: Wed, 29 Jul 92 15:44:56 -0400

From: bill@prism.gatech.edu (Bill Appelbe)

Message-Id: <9207291944.AA07601@prism.gatech.edu>

To: bill@cc.gatech.edu, del296@cc.gatech.edu, dwight@cc.gatech.edu,
jastasia@cc.gatech.edu, jelyne@cc.gatech.edu, kss@cc.gatech.edu,
maurice@cc.gatech.edu, natalie@cc.gatech.edu

Status: OR

Can you all fill out the following brief questionnaire, and send it either back to me or Peter Freeman, the Dean (freeman@cc) if you prefer. Basically we want your suggestions to assist us improving such a program if we do it again next year (we are almost certain to, and enlarge it some too).

Cheers -- Bill

P.S. See you on the 11th.

Name: Jelyne V. Martin

What did you expect to get out of the summer internship (e.g., new skills, some idea of what grad school is like, money)?

I expected to get new skills and a better understanding of old skills from this summer internship. I thought this program I was able to complete my expectations.

To what extent were your expectations fulfilled (completely, partially, not at all) and why?

My expectations were fulfilled completely.

Were there any unexpected benefits

(that is, things that you got out of the internship, or happened, that you enjoyed, but did not anticipate)?

Yes my unexpected benefits were the class from the Dr. Billie Anna Rice. I highly enjoyed the classes.

How would you rate your interactions with:

Highest - 10

Lowest - 1

Staff (such as vicky) 8
Other graduate students you met 9
Coordinators (Bill and Kevin) 10
Your faculty project advisor 9

Were they helpful, available, inspirational, etc.

The staff was very helpful with all of my needs

What suggestions do you have for improving the program (e.g., additional activities, when and for how long the internships should be scheduled)?

When students arrive for the program they should have a set agenda

Would you recommend the program to other students at your college?

yes. I would highly recommend this program to the student of my school.

/users/faculty/general/bill/HPMAIL/hbcuevals

From jastasia@cc.gatech.edu Fri Jul 31 08:38 PDT 1992
 Received: from hplms2.hpl.hp.com by hplcgh.hpl.hp.com with SMTP
 (16.6/15.5/IOS 3.14) id AA15797; Fri, 31 Jul 92 08:38:13 -0700
 Return-Path: <jastasia@cc.gatech.edu>
 Received: from hydra-rich.gatech.edu by hplms2.hpl.hp.com with SMTP
 (16.5/15.5/IOS 3.20) id AA27159; Fri, 31 Jul 92 08:36:48 -0700
 Received: from burdell.cc.gatech.edu by hydra.gatech.edu (5.61/3.1)
 id AA19999; Fri, 31 Jul 92 11:26:27 -0400
 Received: from terminus.cc.gatech.edu by burdell.cc.gatech.edu (4.1/SMI-4.1)
 id AA24681; for bill@prism.gatech.edu; Fri, 31 Jul 92 11:26:15 EDT
 Received: by terminus.cc.gatech.edu (4.1/SMI-4.1)
 id AA00765; Fri, 31 Jul 92 11:26:11 EDT
 From: jastasia@cc.gatech.edu (Jastasia Thomas)
 Message-Id: <92073111526.AA00765@terminus.cc.gatech.edu>
 Subject: Forwarded mail....
 To: bill@cc.gatech.edu
 Date: Fri, 31 Jul 92 11:26:09 EDT
 Cc: jastasia@cc.gatech.edu
 X-Mailer: ELM [version 2.3 PL11]
 Status: R

Forwarded message:

> From bill@prism.gatech.edu Wed Jul 29 15:45:02 1992
 > Date: Wed, 29 Jul 92 15:44:56 -0400
 > From: bill@prism.gatech.edu (Bill Appelbe)
 > Message-Id: <9207291944.AA07601@prism.gatech.edu>
 > To: bill@cc.gatech.edu, del29@cc.gatech.edu, dwight@cc.gatech.edu,
 > jastasia@cc.gatech.edu, jelyne@cc.gatech.edu, kss@cc.gatech.edu,
 > maurice@cc.gatech.edu, natalie@cc.gatech.edu
 >
 > Can you all fill out the following brief questionnaire, and send it either
 > back to me or Peter Freeman, the Dean (freeman@cc) if you prefer. Basically
 > we want your suggestions to assist us improving such a program if we do it
 > again next year (we are almost certain to, and enlarge it some too).

> Cheers -- Bill

> P.S. See you on the 11th.

> Name: Jastasia T. Thomas

> What did you expect to get out of the summer internship
 > (e.g., new skills, some idea of what grad school is like, money)?
 > I expected to receive new skills and to familiarize myself with the research
 > ent.

> To what extent were your expectations fulfilled
 > MY expectations were fulfilled to the extent that I was able to familiarize
 > with new language, work stations and network, and were able to take
 > extension courses.
 > (completely, partially, not at all) and why?

> Were there any unexpected benefits

> (that is, things that you got out of the internship, or happened, that
 > you enjoyed, but did not anticipate)?
 > Yes, the extension courses.

> How would you rate your interactions with:

> Staff (such as vicky) _good_ _____
 > Other graduate students you met _good_ _____
 > Coordinators (Bill and Kevin) _very good_ _____
 > Your faculty project advisor _good_ _____
 >
 > Were they helpful, available, inspirational, etc.
 > Yes, they were helpful and available.

> What suggestions do you have for improving the
 > program (e.g., additional activities, when and
 > for how long the internships should be scheduled)?

> I suggest that the program begin on June 1st, meaning that each student will
 > get an agenda of who is his advisor and his project choices on this day.
 > that orientation should be a week earlier. In this way, the whole 8
 > weeks will be spent on the project.

> Would you recommend the program to other students at
 > your college?

From natalie@cc.gatech.edu Thu Jul 30 07:52 PDT 1992
 Received: from hplms2.hpl.hp.com by hplcgh.hpl.hp.com with SMTP
 (16.6/15.5/IOS 3.14) id AA03729; Thu, 30 Jul 92 07:52:27 -0700
 Return-Path: <natalie@cc.gatech.edu>
 Received: from hydra-rich.gatech.edu by hplms2.hpl.hp.com with SMTP
 (16.5/15.5/IOS 3.20) id AA17715; Thu, 30 Jul 92 07:52:37 -0700
 Received: from burdell.cc.gatech.edu by hydra.gatech.edu (5.61/3.1)
 id AA02526; Thu, 30 Jul 92 10:43:00 -0400
 Received: from terminus.cc.gatech.edu by burdell.cc.gatech.edu (4.1/SMI-4.1)
 id AA14140; for bill@prism.gatech.edu; Thu, 30 Jul 92 10:42:47 EDT
 Received: by terminus.cc.gatech.edu (4.1/SMI-4.1)
 id AA13204; Thu, 30 Jul 92 10:42:44 EDT
 From: natalie@cc.gatech.edu (Natalie Nelson)
 Message-Id: <9207301442.AA13204@terminus.cc.gatech.edu>
 Subject: Questionare
 To: bill@cc.gatech.edu
 Date: Thu, 30 Jul 92 10:42:44 EDT
 X-Mailer: ELM [version 2.3 PL11]
 Status: R0

I think

Name: Natalie K. Nelson

What did you expect to get out of the summer internship (e.g., new skills, some idea of what grad school is like, money)? The money is always a plus, but learning new skills, ideas, and technologies is on the top of the list. The main expectation was to receive as much knowledge about grad school as possible.

To what extent were your expectations fulfilled (completely, partially, not at all) and why? My expectations were fulfilled completely. I received knowledge about a subject I knew nothing about, improved my skills of working with others, and how I should go about getting prepared for grad school.

Were there any unexpected benefits (that is, things that you got out of the internship, or happened, that you enjoyed, but did not anticipate)? The unexpected benefit I received was the UNIX for Users/Programmers. This class was full of information that I felt I needed to know and I am glad that I was able to take the continuing education course.

How would you rate your interactions with: Staff (such as vicky) - helpful, available Other graduate students you met - very helpful, inspirational Coordinators (Bill and Kevin) - extremely helpful, inspirational; their willingness to guide and help was great Your faculty project advisor - helpful

Were they helpful, available, inspirational, etc.

What suggestions do you have for improving the program (e.g., additional activities, when and for how long the internships should be scheduled)? If possible I think that the internship should last for a longer period of time.

Would you recommend the program to other students at your college? Yes, this program can be a stepping stone if used properly. It gives you a chance to improve the skills you have learned over the years and also be introduced to new skills and ideas.

From natalie@cc.gatech.edu Thu Jul 30 08:07 PDT 1992
Received: from hplms2.hpl.hp.com by hplcgh.hpl.hp.com with SMTP (16.6/15.5+IOS 3.14) id AA041121: Thu, 30 Jul 92 08:07:56 -0700
Return-Path: <natalie@cc.gatech.edu>
Received: from hydra-rich.gatech.edu by hplms2.hpl.hp.com with SMTP

/users/faculty/general/bill/HPMAIL/hbcuevals

(16.5/15.5+IOS 3.20) id AA17826; Thu, 30 Jul 92 08:08:08 -0700
Received: from burdell1.cc.gatech.edu by hydra.gatech.edu (5.61/3.1) id AA05857; Thu, 30 Jul 92 10:58:31 -0400
Received: from terminus.cc.gatech.edu by burdell1.cc.gatech.edu (4.1/SMI-4.1) id AA14302; for bill@prism.gatech.edu; Thu, 30 Jul 92 10:58:22 EDT
Received: by terminus.cc.gatech.edu (4.1/SMI-4.1) id AA13614; Thu, 30 Jul 92 10:58:18 EDT
From: natalie@cc.gatech.edu (Natalie Nelson)
Message-Id: <9207301458.AA13614@terminus.cc.gatech.edu>
Subject: Thank You!
To: bill@cc.gatech.edu, kss@cc.gatech.edu, natalie@cc.gatech.edu
Date: Thu, 30 Jul 92 10:58:17 EDT
X-Mailer: ELM (version 2.3 PL11)
Status: RO

Bill and Kevin,

I just wanted to write and say thank you. It has been a great learning experience. I have truly learned more than I had expected. Your guidance and your help was and is appreciated. Once again thank you.

-Natalie K. Nelson

From del296@jensen.cc.gatech.edu Fri Jul 31 08:46 PDT 1992
Received: from hplms2.hpl.hp.com by hplcgh.hpl.hp.com with SMTP (16.6/15.5+IOS 3.14) id AA15984; Fri, 31 Jul 92 08:46:26 -0700
Return-Path: <del296@jensen.cc.gatech.edu>
Received: from hydra-rich.gatech.edu by hplms2.hpl.hp.com with SMTP (16.5/15.5+IOS 3.20) id AA27298; Fri, 31 Jul 92 08:46:35 -0700
Received: from burdell1.cc.gatech.edu by hydra.gatech.edu (5.61/3.1) id AA21683; Fri, 31 Jul 92 11:36:58 -0400
Received: from jensen (jensen.cc.gatech.edu) by burdell1.cc.gatech.edu (4.1/SMI-4.1) id AA24749; for bill@prism.gatech.edu; Fri, 31 Jul 92 11:36:47 EDT
Received: by jensen (NEXT-1.0 (From Sendmail 5.52)/NEXT-1.0) id AA00184; Fri, 31 Jul 92 11:35:02 PDT
Date: Fri, 31 Jul 92 11:35:02 PDT
From: del296@cc.gatech.edu (Delano Glanville)
Message-Id: <9207311835.AA00184@jensen>
Received: by Next Mailer (1.63)
To: bill@cc.gatech.edu
Subject: Questioniare
Status: R

Name: Delano Glanville
Date: July 31, 1992

What did you expect to get out of the summer internship (e.g., new skills, some idea of what grad school is like, money)?

I expect to what grad school was like.

To what extent were your expectations fulfilled (completely, partially, not at all) and why?

I really did not know what to expect, I did have a preconceived idea that grad school would be difficult and the work being done I would never understand. Why I had this idea, well after



hearing some people spend years in grad school I did not know what to think, because I know these people are not dumb. Next I thought only brilliant people go to grad school.

Were there any unexpected benefits

(that is, things that you got out of the internship, or happened, that you enjoyed, but did not anticipate)?

I learnt about a variety of different machines I never had access to. I got to take interesting courses.

How would you rate your interactions with:

Staff (such as vicky)	Good
Other graduate students you met	Good
Coordinators (Bill and Kevin)	Very Good
Your faculty project advisor	Very Good

Were they helpful, available, inspirational, etc.

I got a lot of help from all who was part of the program.

What suggestions do you have for improving the program (e.g., additional activities, when and for how long the internships should be scheduled)?

The initial meeting should be a week before the program starts. This would allow time to plan each project and for the interns find out who they will be working with.

Would you recommend the program to other students at your college?

Yes I would. It was good I got a chance to see the difference between the computer science here and my computer science department.

From dwight@cc.gatech.edu Fri Aug 7 10:07 PDT 1992
Received: from hplms2.hpl.hp.com by hplcgh.hpl.hp.com with SMTP (16.6/15.5+IOS 3.14) id AA05043; Fri, 7 Aug 92 10:07:25 -0700
Return-Path: <dwight@cc.gatech.edu>
Received: from hydra-rich.gatech.edu by hplms2.hpl.hp.com with SMTP (16.5/15.5+IOS 3.20) id AA08092; Fri, 7 Aug 92 10:07:42 -0700
Received: from gatech.edu by hydra.gatech.edu (5.61/3.1) id AA14844; Fri, 7 Aug 92 12:57:44 -0400
Received: from burdell.cc.gatech.edu by gatech.edu (4.1/Gatech-9.1) id AA02901 for bill@prism.gatech.edu; Fri, 7 Aug 92 12:57:28 EDT
Received: from terminus.cc.gatech.edu by burdell.cc.gatech.edu (4.1/SMI-4.1) id AA13613; for bill@prism.gatech.edu; Fri, 7 Aug 92 12:57:26 EDT
Received: by terminus.cc.gatech.edu (4.1/SMI-4.1) id AA07054; Fri, 7 Aug 92 12:57:23 EDT
From: dwight@cc.gatech.edu (Dwight Hugget)
Subject: Re: Your mail
Message-Id: <9208071657.AA07054@terminus.cc.gatech.edu>
To: bill@prism.gatech.edu (Bill Appelbe)
Date: Fri, 7 Aug 92 12:57:22 EDT

/users/faculty/general/bill/HPMAIL/hbcuevals

Cc: dwight@cc.gatech.edu
In-Reply-To: <9207291944.AA07601@prism.gatech.edu>; from "Bill Appelbe" at Jul 29, 92 3:44 pm
X-Mailer: ELM (version 2.3 PL11)
Status: R

> Can you all fill out the following brief questionnaire, and send it either
> back to me or Peter Freeman, the Dean (freeman@cc) if you prefer. Basically
> we want your suggestions to assist us improving such a program if we do it
> again next year (we are almost certain to, and enlarge it some too!).

> Cheers -- Bill
> P.S. See you on the 11th.

> Name: Dwight_M._Hugget

> What did you expect to get out of the summer internship
> (e.g., new skills, some idea of what grad school is like, money)?

> I was expecting to get new skills in UNIX, C, and C++ primarily and
> other skills as was necessary. I also wanted to get a realistic view of
> what graduate school is all about, what was expected on the grad. level, and
> what it takes to succeed. The stipend was not an important factor because
> the contacts and knowledge gained will outlast money in the long run. I
> did gain skills in the graphics area which I didn't have before.

> To what extent were your expectations fulfilled
> (completely, partially, not at all) and why?

> My expectations were fulfilled. I wanted C, C++, and UNIX exposure along
> with working on a meaningful project. I was able to get all of that plus
> more. I took a continuing education UNIX course which brought me up to
> speed, read books on C and C++, and wrote a few programs. Most of my
> expectations were fulfilled when I decided to join professor Shackelford's
> research team. I learned a lot while designing the graphics interface unit
> for Optimus. In retrospect, I can safely say that my expectations were
> completely fulfilled.

> Were there any unexpected benefits
> (that is, things that you got out of the internship, or happened, that
> you enjoyed, but did not anticipate)?

> Yes. I thought we would be limited to working 9 - 5. I was elated when we
> were given keys which gave us unlimited access to the labs. This was
> unexpected and good for me because I'm a very moody worker. I sometimes
> enjoy working late hours. I never thought that I would end up with a chance
> to be in another program. I am being considered by Dr. Hodges for an
> upcoming undergraduate GUV project. Another surprise was the fact that the
> faculty and staff was so very cooperative. That is, if that person couldn't
> help you, then they knew someone who could.
> Lastly, the entire atmosphere during my stay was great. I really felt at
> home.

/users/faculty/general/bill/HPMAIL/hbcuevals

> How would you rate your interactions with:

> Staff (such as vicky) _good_and others were great (Ms. Hutchesen)____
 > Other graduate students you met _excellent____
 > Coordinators (Bill and Kevin) _super_(very serious people, caring, and
 understanding) _____

> Your faculty project advisor_(Prof. Shackelford)_____
 I enjoy working with him. I feel good with him person to person. I like
 his attitude as well as his work. I like his work so much that I have asked
 him if he would keep me until the end of August. He agreed.

> Were they helpful, available, inspirational, etc.
 yes. everyone was helpful although they were busy at times.

> What suggestions do you have for improving the
 program (e.g., additional activities, when and
 for how long the internships should be scheduled)?

I think the program is good the way it is now. However, if you could
 extend it to Aug. The reason is that the first couple of weeks are spent
 match making. Also, the projects are so interesting that it takes you a
 while before you fully understand and get to the point where you can
 contribute. That's why it should be extended into Aug. Lastly, if it is
 possible, arrange to have a UNIX class for the interns before they start
 hacking on the system. Just to familiarize the interns with the system.

> Would you recommend the program to other students at
 your college?
 Yes I would.