

Managing Student Workers: How to Effectively Schedule and Supervise Student Workers in a Dynamic Environment

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ABSTRACT

A web-based scheduling system with a graphical user interface was created at Texas A&M University in the department of Computing & Information Services which allowed student workers to request when they wanted to work, when they were willing to work, and when they were unable to work. Additional tools were created allowing students to view individual student worker schedules, view daily schedules, and trade hours.

In addition to the ease of scheduling via the web, day-to-day supervision has been simplified. Benefits for the lab supervisors include immediate email notification of schedule changes from trading of hours, an up-to-date daily schedule showing where potential problems may occur, and when to expect students to arrive at work.

This paper will describe the evolution of the web-based scheduling system from a simple method of gathering students' schedule information to a complex application for trading hours between labs. With student worker input this process of evolution has become a team effort.

Keywords

Scheduling, supervising, student workers, management systems, web interface.

1. INTRODUCTION

In fall 1998, Computing and Information Services (CIS) at Texas A&M University opened the Student Computing Center (SCC), holding approximately 540 computers. The SCC is open 24 hours a day during the week and is also open on the weekend. The SCC employs approximately 60 student workers and 7 full-time employees. There are 4 additional labs run by CIS, together

known as Open-Access Labs, giving a total of approximately 170 student workers. All Open-Access Labs are available to all students of Texas A&M University.

In the past, each lab supervisor scheduled student workers by hand. The process included a meeting where the student workers would sign up for the hours they wanted to work. A sheet of paper with the semester schedule was passed around to the students in seniority order, and they would then write in where they wanted to work. This process was cumbersome, and if a student did not attend the meeting, they would lose their seniority for that semester and have fewer hours from which to choose. The process also made it difficult to keep track of how many students were assigned to any one given hour. A spreadsheet was later developed to help facilitate the supervisor in scheduling those hours. The spreadsheet would keep track of the total number of hours assigned to the schedule, thus preventing the supervisor from scheduling more students in a given hour than assigned.

With the SCC opening, it was imperative to find a new method for scheduling student workers. The process for scheduling 60 students in one lab would take forever if done by hand.

2. THE EVOLUTION

The process of evolution started just before the SCC opened, which was approximately two weeks before the fall semester began. The first sign-up meeting took twice as long to complete and less than half of the staff was there to complete it. It was obvious at that point that a new method was prudent, and thus a web-based management system was born. The process began small and has developed into a complex management system, which when utilized properly can help manage and supervise student workers.

2.1 Schedule Requests

The first step in improving the process was to develop a tool that would allow the students to request the hours they could work. These requests can be made at anytime prior to scheduling with a web-based program (scheduler). Several factors were made to help the students' present information for when they could work. These factors are listed as follows: Lab hours, priority system, number of hours scheduled, and additional comments.

2.1.1 Lab hours

The first step is to set the schedule. The students are presented with a blank grid, which displays when the lab is opened, and when the lab is closed (see Figure 1). All cells marked as closed are not editable by the student. The schedule begins on Thursday and ends on Wednesday to follow the Texas A&M University payroll schedule. The lab hours are only on the hour, and not on the half-hour; with over 60 students from one lab, it could be a scheduling nightmare to accommodate schedules on the half-hour.

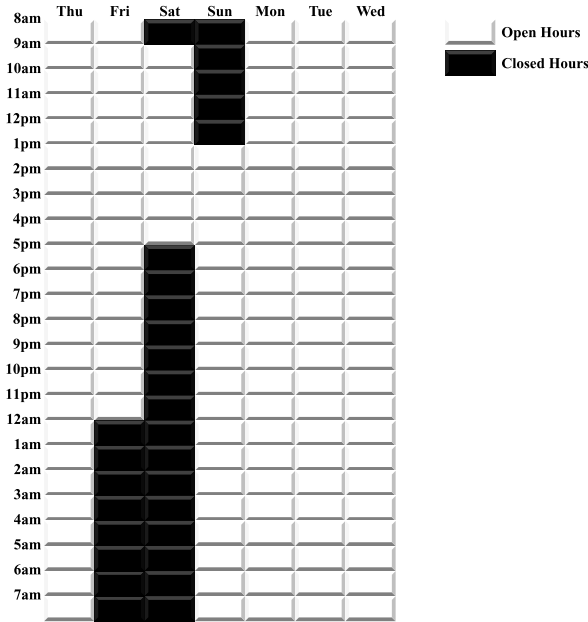


Figure 1. Hours of Operation

2.1.2 Priority system

In the second step, the student must decide when they want to work. The student is provided with four choices on setting their schedule. These choices are: High priority, medium priority, low priority, and not available.

High priority is the student's preferred schedule. These are the hours the student wants the most. Medium priority is where the student can work if they cannot get their preferred schedule. Low priority is where they are willing to work if there is nothing else. Not available is where they cannot work because of class schedules, study groups, etc.

The scheduler allows the student to select each priority in the legend, and simply click on the cells to update his/her schedule request to reflect the type of schedule they want (see Figure 2). The scheduler also allows for multiple selections of cells by clicking and dragging over a number of cells to change the cell information.

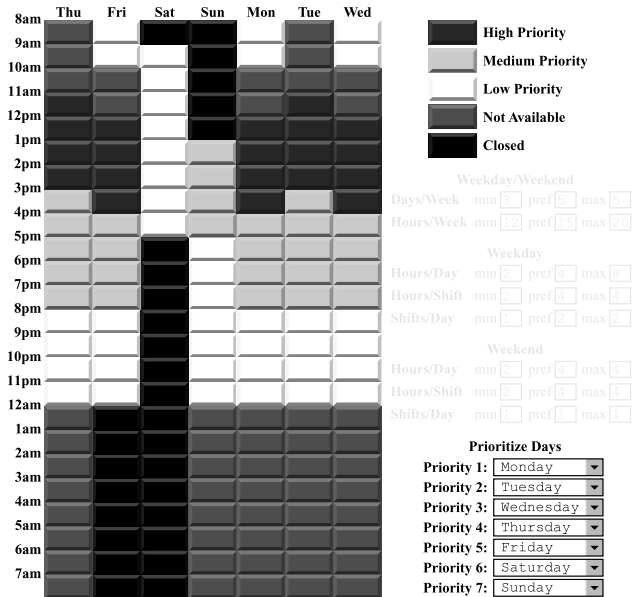


Figure 2. Setting Priorities

In addition to prioritizing where they want to work, they also have the ability to prioritize which days to schedule first. As you can see from Figure 2, the student prefers to work Monday through Friday. They may want to have Monday, Wednesday and Friday to be scheduled first, and then Tuesday and Thursday. In the SCC, schedules are made using a seniority system, and several passes are made to provide each student with a fair chance to get preferred hours. Prioritizing the days as well tells the supervisor which days are most preferred of all preferred hours.

2.1.3 Number of hours scheduled

In the third step, the student provides additional information on how many hours they want to work, and for how long at any one given time. The scheduler provides 5 additional categories for the student to provide information. These categories are: Days per week, hours per week, hours per day, hours per shift, and shifts per day.

These categories are also broken into 3 sections (see Figure 3). The first two categories supply information on how many days per week and how many hours per week that the student wants to work. For each category, they have a choice of minimum, preferred, and maximum number of days or hours per week.

The last three categories are broken into weekdays and weekends. Since a student may want to work more hours on a weekend than during the weekdays, it was necessary to break down the criteria to reflect that information. The last three categories provide the supervisor with how many hours per day the student wants to work, how many hours per shift, and how many shifts per day the student wants to work. Again, the student can provide a minimum, preferred, and maximum to each category.

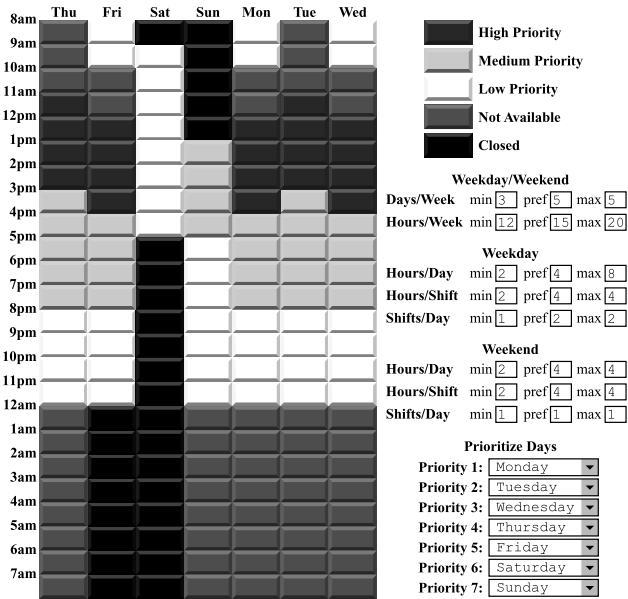


Figure 3. Setting Preferences

2.1.4 Additional comments

Additional comments can be entered when submitting the schedule request. These comments can be anything additional the student may want to express to help clarify any special constraints or requests the student may have.

2.2 Scheduling Hours

After the students put in their schedule requests, there should be enough information to effectively schedule them. There are several tools available to the supervisor to help guide in the scheduling process. These tools are as follows: Setting available hours, viewing all requests, and administering the employee's schedule.

2.2.1 Setting available hours

The SCC has six different stations where student workers can work. Each of these stations has one to three employees working at any given hour. This section provides the supervisor with a tool to store the total number of hours for all six areas of the schedule into a database. As the supervisor schedules employees, the total number of hours decrement.

2.2.2 Viewing all requests

Viewing all requests is a helpful tool for determining where weak areas in the schedule will be. When the students put in their schedule requests, it is broken down into high priority, medium priority, low priority, and not available as previously stated in section 2.1.2. When viewing all requests, a choice can be made to view how many students want to work at any given hour based on the different priority levels as follows: All, high and medium, and high requests.

2.2.2.1 All Requests

This category provides all priority levels for each student at every hour on the schedule and is displayed in a table where the scheduler ID for each student is displayed in each cell based on

their availability (see Table 1). Low priority hours are denoted with <XXX> and medium priority hours are denoted with (XXX), where XXX is the scheduler ID. Table 1 only shows the first nine hours; however, the actual schedule would reflect 24 hours.

Table 1. View All Requests for a Schedule

	Thu	Fri	Sat	Sun	Mon	Tue	Wed
8am	<078-079 089 (091) 092 <098- <102> 104 113	023 066 068 <078- 079 089 (091) 092 <098- <102> 104 113			<078- 079 089 (091) 092 <098- <102> 104 113	<078- 079 089 091 092 <098- <102> 104 113	<078- 079 089 (091) 092 <098- <102> 104 <109- <113
9am	048 <078- 079 089 (091) 092 <098- <102> 104 (109) (113) 114	023 048 066 068 <078- 079 089 (091) 092 <098- <102> 104 (109) (113) 114	079 091 <098- <102> 104 <109- <113		048 <078- 079 089 (091) 092 <098- <102> 104 (109) (113) 114	048 <078- 079 089 (091) 092 <098- <102> 104 (109) (113) 114	048 <078- 079 (091) 092 <098- <102> 104 (109) (113) 114
10am	042 044 048 075 <077- <078- 084 088 089 092 <098- (102) 103 104 109 114 115	042 044 048 066 068 075 <077- <078- 088 089 092 098 (102) (103) 104 109 114	(044) 079 091 098 <102- <111> 113 <114>		044 048 052 075 <077- <078- (084) 088 089 092 <098- 109 114 115	042 044 048 052 075 <077- <078- (084) 088 089 092 <098- (102) 103 104 109 114 115	042 044 048 052 075 <077- <078- (084) 088 089 092 <098- (102) 103 104 109 114 115
11am	042 044 048 075 <077- <078- 084 088 089 092 <098- (102) 103 104 109 114 115	042 044 048 066 068 075 <077- <078- 088 089 092 <098- (102) (103) 104 109 114	<029- (044) 079 091 098 <102- 108 <114>		044 048 052 075 <077- <078- (084) 088 089 092 <098- 102 103 104 114 115	042 044 048 052 075 <077- <078- (084) 088 089 092 <098- 102 103 104 109 114 115	042 044 048 052 075 <077- <078- (084) 088 089 092 <098- 102 103 104 109 114 115
12pm	014 023 033 038 042 044 048 058 075 <078- 084 088 092 <098- 102 103 104 115 116	042 044 048 057 058 066 068 075 <078- 088 092 <098- (102) (103) 104 109 114 115	<029- (044) 079 091 098 <102- 108 <114>		033 044 048 052 058 075 <078- 084 088 092 <098- 102 103 104 115 116	044 048 052 058 075 <078- 084 088 092 <098- 102 103 104 115 116	033 044 048 052 058 075 <078- 084 088 092 <098- 102 103 104 115 116
1pm	014 023 033 038 042 044 048 053 075 <078- (079) 084 088 089 <091- 092 <098- 102 103 104 109 111 113 114 116	042 044 048 053 057 066 068 075 <078- (079) 088 089 091 <092 <098- 102 103 104 109 111 113 114 116	<029- (044) 053 (057) 058 <057- 058 <102- 108 (109) <111- <114>	<029- (044) 053 (057) 058 <057- 058 <102- 108 (109) <111- <114>	023 033 038 044 048 052 053 075 <078- (079) 084 088 089 <091- 092 <098- 102 103 104 109 111 113 114 116	014 023 033 038 042 044 048 052 053 075 <078- (079) 084 088 089 <091- 092 <098- 102 103 104 109 111 113 114 116	023 033 038 042 044 048 052 053 075 <078- (079) 084 088 089 <091- 092 <098- 102 103 104 109 111 113 114 116
2pm	014 023 033 038 042 044 048 053 067 075 <078- (079) 084 088 089 092 098 109 111 113 114 116	042 044 048 053 057 066 068 075 <078- (079) 085 089 092 098 109 111 113 114 116	<029- (044) 053 (057) 058 <057- 058 <102- 108 (109) <111- <114>	<029- (044) 053 (057) 058 <057- 058 <102- 108 (109) <111- <114>	023 033 038 044 048 052 053 075 <078- (079) 084 088 089 092 098 109 111 113 114 116	014 023 033 038 042 044 048 052 053 075 <078- (079) 084 088 089 092 098 109 111 113 114 116	023 033 038 042 044 048 052 053 075 <078- (079) 084 088 089 092 098 109 111 113 114 116
3pm	014 023 033 038 042 044 048 053 057 066 075 <078- (079) 084 088 089 092 098 109 111 113 114 116	029 (042) 044 048 053 057 066 075 <078- (079) 084 088 092 098 109 111 113 114 116	<029- (044) 053 (057) 058 <057- 058 <102- 108 (109) <111- <114>	<029- (044) 053 (057) 058 <057- 058 <102- 108 (109) <111- <114>	023 029 033 038 044 048 052 053 075 <078- (079) 084 088 089 092 098 109 111 113 114 116	014 023 033 038 042 044 048 052 053 075 <078- (079) 084 088 089 092 098 109 111 113 114 116	023 029 033 038 042 044 048 052 053 075 <078- (079) 084 088 089 092 098 109 111 113 114 116
4pm	014 023 <029- 038 044 048 053 057 066 075 <078- (079) 084 088 089 092 098 109 111 113 114	029 044 048 053 057 058 (075) <078- (079) 084 088 092 098 109 111 113 114	<029- (044) 053 (057) 058 <057- 058 <102- 108 (109) <111- <114>	<029- 053 (057) 058 <078- 091 <092- 098 <102- 108 (109) <111- (114)	023 029 033 038 044 048 052 053 075 <078- (079) 084 088 089 092 098 109 111 113 114	014 023 <029- 033 038 044 048 052 053 075 <078- (079) 084 088 089 092 098 109 111 113 114	023 029 033 038 042 044 048 052 053 075 <078- (079) 084 088 092 098 109 111 113 114

XXX – High Priority, (XXX) – Medium Priority, <XXX> – Low Priority

This category also provides a key (not shown), which lists all employees who have put in their requests that are available to work.

From Table 1 we see that there are some weak areas, particularly in the mornings and on Saturday. These areas should be focused on first. This method is also useful for determining whether additional employees need to be hired.

2.2.2.2 High and Medium Requests

This category provides the high and medium priority levels only. I have found this category to be useful when scheduling the students. In most cases, schedules can be made without using any low priority requests.

2.2.2.3 High Requests

This category provides the high priority level only. This is the ideal schedule. If all hours can be made from using only high priority hours, then the employees will all be working their preferred schedule.

2.2.3 Administering the employee's schedule

Administering the employee's schedule is similar to the interface for the employee making a schedule request. When editing an employee's schedule, the interface begins with the employee's

schedule request (see Figure 3). A new layer is placed on top of the employee's schedule request, which shows the available hours to choose from for each area in the lab. Any hours assigned are designated in black, where any available hours are designated in red. When scheduling for an employee, click on one of the stations, i.e., Help Desk 1, Print Room 1, Information Booth, etc., and click on the cells where the available hours are for that station to schedule the student (see Figure 4). The numbers to the left of each label denotes how many remaining hours are left for that particular station.

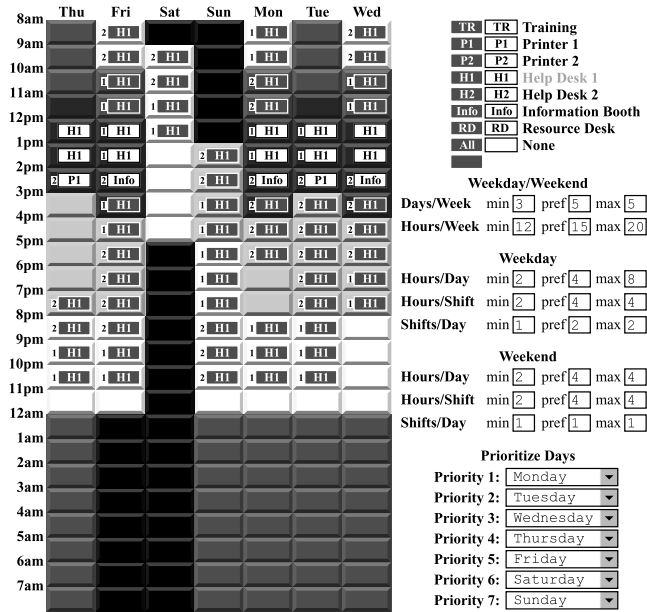


Figure 4. Viewing Help Desk 1 Available Hours

As the overall schedule nears completion, the “All” category is useful for finding what hours are left to quickly identify where an employee can be scheduled (see Figure 5). The “All” category is also useful for helping distribute the schedule evenly. By watching the overall number of hours remaining, it simplifies scheduling evenly across the entire schedule.

2.3 Viewing Schedules

Viewing schedules are one of the more widely used tools. There are two tools for viewing schedules: View weekly schedule, and view daily schedule.

2.3.1 View weekly schedule

This tool provides a way to view an employee's weekly schedule. Any supervisor or other employee can view this information.

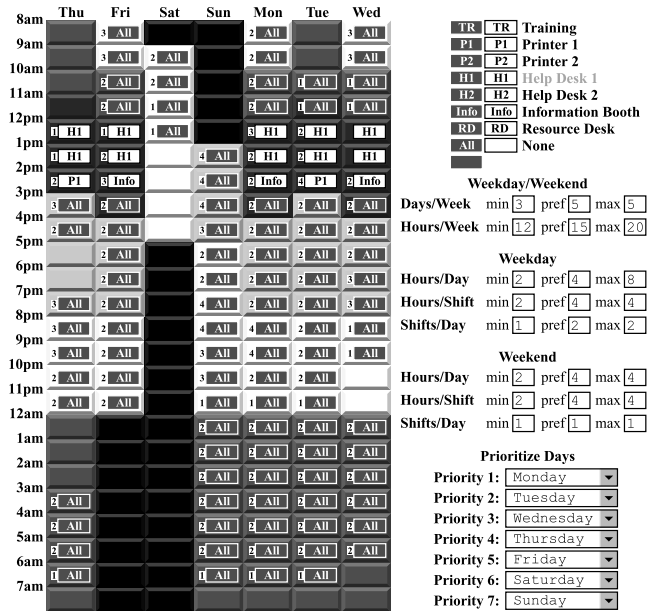


Figure 5. Viewing All Available Hours

2.3.2 View daily schedule

The daily schedule is the most useful tool for day-to-day supervision. Daily printouts can be made in the morning and placed in each station in the lab to help the supervisors and student workers know who is supposed to be where.

The daily schedule is presented in a table format where the employee's scheduler ID is placed in the appropriate row (time) and column (station). In addition to the scheduler ID, the employee's first name is placed after their ID and it is bold if they are first coming into the lab to work (see Table 2).

If there is a break in their schedule, their name will appear again to reflect coming into the lab again. A key at the bottom (not shown) lists all employees working that day. The key is presented numerically based on the scheduler ID, and alphabetically. Table 2 only shows the first nine hours; however, the actual schedule would reflect 24 hours.

Table 2. View Daily Schedule

	Resource		First Floor		Second Floor	
	Info Desk	Desk	Help Desk #	Printer #1	Help Desk #	Printer #2
8am	113:Kris	115:Kristin	079:Greg	091:Christine	033:Austin	068:Kevin
9am	048:Robert 091	113	079	033 068	115	116:Richard
10am	068 113	128:Athens	033 091	048 115	085:Larkin	114:Dathan
11am	084:Sara 115	068	048 091	085 113	114	128
12pm	044:Juan	068	084 085	114 116:Richard	128	113
1pm	025:Paul 085	128	113	044 084	114	068
2pm	044 084	023:Matt	048:Robert 113	068 085	025	103:Anu
3pm	068 103	029:Andrew	023 113	038:Melissa 048	025	084
4pm	023 116:Richard	068	029 048	103 113	038	025

2.4 Trading Hours

When the SCC was first opened, student workers that transferred from other labs had requested there be an easier way to trade hours. With over 60 students being scheduled, keeping track of trading of hours by e-mail or word of mouth would have been difficult. Several factors had to be considered in order to help automate trading of hours. These factors are as follows: Giving up hours, taking hours, updating schedule views, and a tracking system.

2.4.1 Giving up hours

Giving up hours is the first stage of trading. When an employee gives up their hours, they go to a web page where they can select the hours that they want to give up. Once they have selected the hours, they submit the request. After the request is submitted, they can send an e-mail notification on the hours they are giving up. The e-mail automatically includes the hours given up, along with the location in the lab they are working. The employee can add any additional comments they wish before sending the notification.

Before the trading of hours was available on-line, the method for trading hours was done on a listserv. This sent e-mail to people who would never be trading hours. An additional tool was added to the employee's scheduler ID that included their e-mail address. All e-mail notifications are now made from the scheduler, and not from a listserv. In addition, the employee is capable of turning off notification if they feel they will never be able to take other hours.

2.4.2 Taking hours

Taking hours is the second stage of trading. When an employee takes hours, they go to a web page where they can select the hours that they want to take. Once they have selected the hours, they submit the request. After the request is submitted, confirmation is made that the hours are taken, and an automatic e-mail notification is made to the employee who took the hours, to the employee who gave up the hours, and to all supervisors.

2.4.3 Updating schedule views

In section 2.3, the two tools for viewing schedules must be updated to reflect changes because of hours being traded. With the addition of trading hours, additional information is necessary to distinguish between an employee's regular hours, hours the employee is trying to give up, and hours the employee has taken.

2.4.3.1 Update – View weekly schedule

In viewing weekly schedules, each type of hour is distinguished by a different color and are listed as follows:

- Regular hours – black
- Given up hours – red
- Taken hours – green

If another employee or supervisor has taken any hours that were previously given up, then those hours will no longer appear on the employee's schedule for that week.

2.4.3.2 Update – View daily schedule

In viewing the daily schedules, each type of hour is distinguished by a different color, as described in section 2.4.3.1, however, an additional notation is added to given up hours and taken hours. Since the daily schedules are printed on a black and white printer, it is necessary to help distinguish the different types of hours. The additional notations include, < > for given up hours, and () for taken hours (see Table 3).

Table 3. Updated View Daily Schedule

	Resource		First Floor		Second Floor	
	Info Desk	Desk	Help Desk #	Printer #1	Help Desk #	Printer #2
8am	<113:Kris>	115:Kristin	079:Greg	091:Christine	033:Austin	068:Kevin
9am	048:Robert 091	<113>	079	033 068	115	116:Richard
10am	068 <113>	128:Athena	033 091	048 115	085:Larkin	114:Dathan
11am	084:Sara 115	068	048 091	085 <113>	114	128
12pm	044:Juan	(001:Cynthia)	084 085	114 116:Richard	125	<113>
1pm	025:Paul 085	128	<113>	044 084	114	(001)
2pm	044 084	023:Matt	048:Robert <113>	(001) 085	025	103:Anu
3pm	(001) 103	029:Andrew	023 <113>	(000:Mike) 048	025	084
4pm	023 (066:Kerri)	(001)	029 (002:Court)	103 <113>	(000)	025

2.4.4 Tracking system

A tracking system was created to help the supervisors see when hours were given up and taken. This tool is helpful when seeing which employees take the initiative to take other hours.

2.5 Security

There are several levels of security in the scheduler program. These levels of security are listed as follows: Web page security, employee security, lab supervisor security, and empowered security.

2.5.1 Web page security

A Computing and Information Services (CIS) password is required at the home page to prevent anyone outside CIS from viewing any scheduler information. Each employee in CIS is given a CIS account, which allows individuals from other departments within CIS to view lab schedules.

2.5.2 Employee security

Each employee is given a scheduler password, which prevents other employees from changing schedule requests. The scheduler password also prevents employees from giving up or taking hours as another employee.

2.5.3 Lab supervisor security

The lab supervisor has additional security, which prevents employees from setting schedules. The lab supervisor has full control of each employee's schedule, and may make any changes such as giving up or taking hours, as if the supervisor was the employee.

2.5.4 *Empowered security*

The lab supervisor may also empower other full-time employees to make changes to student worker schedules by allowing them to give up or trade hours as well. In some cases an employee may call in sick, and is unable to give up their hours. An empowered employee (supervisor) can give up the hours for the student worker.

2.6 Special Schedules

Special schedules were introduced when Thanksgiving arrived. In order to schedule the students during semester breaks, and on holidays, special schedules were used to reflect the needs for a change in the schedule. Special schedules can be utilized in two different ways: schedule weeks that are completely unique, and schedule weeks that are partially unique.

2.6.1 *Completely unique schedules*

A completely unique schedule is one where the information on the schedule is self-contained for that week, or a number of weeks. One example of a self-contained schedule would be the regular schedule for a semester. This schedule is utilized for several weeks, and any hours that are traded are stored individually for each week the regular schedule utilized. Other examples of completely unique schedules would be interim weeks between semesters. These types of schedules are only used for one week, and any trading information is stored within that week.

2.6.2 *Partially unique schedules*

A partially unique schedule is one where only part of the week needs to be scheduled. An example of a partially unique schedule would be Thanksgiving. Only a portion of the week needs to be scheduled differently, and the other portion of the week can utilize another schedule such as the regular schedule for the fall semester. This method can save time in scheduling the students because the supervisor and the employee are only required to change what is necessary.

2.7 Incorporating All Labs

After a semester had gone by, and several tools were developed, it was time to standardize across all Open-Access Labs. There were a number of factors to consider when planning for all labs to utilize the scheduler program. These factors are listed as follows: Lab uniqueness, trading hours across labs, and updating schedule views.

2.7.1 *Lab uniqueness*

Each lab can be unique in the number of stations as well as the types of stations. The SCC has six different stations, where most other labs have two.

2.7.2 *Trading hours across labs*

With the addition of the other labs on the scheduler, resources can now be shared to help cover in any lab. If one employee needs to take time off, any employee from any lab is able to take those hours and cover them.

Giving up hours is the same as it was before, however, when sending e-mail notification, the notification can be sent to all labs.

The employee can choose which labs to send the notification to. The default notification is his/her on lab.

Taking hours has one added feature such that the employee has to select which lab to view available hours to take, and then take the hours. The reason for the separation prior to viewing available hours is because of the uniqueness of each lab. If an employee takes hours from another lab, automatic e-mail notification is sent to the employee, the employee the hours were taken from, and the supervisors of both labs.

2.7.3 *Updating schedule views*

In section 2.4.3, the two tools for viewing schedules must be updated to reflect changes because of hours being traded across labs. With the addition of other labs, additional information is necessary to distinguish between the employee's lab and other labs.

2.7.3.1 *Update – View weekly schedule*

In viewing weekly schedules, if an employee takes hours from another lab, it is reflected on his/her schedule by the lab acronym (SCC, RCC, etc.). If an employee originally works in the SCC, but has taken hours in the Read Computing Center (RCC), then the hours that are taken from the RCC are denoted as RCC on the schedule. If the employee wants to see what station(s) they will be working at, they can choose to view the schedule for the RCC. By changing to the RCC, the legend changes to show the stations for the RCC.

2.7.3.2 *Update – View daily schedule*

The only changes to viewing the daily schedule are an addition to the scheduler ID that includes the lab name along side the scheduler ID, i.e., **READ-052:Michael**, and a key at the bottom that will list the employees that are working that day.

2.8 Training Hours

Each student takes one hour of training a week during a regular semester. Adding the training hour to the schedule was an entirely new challenge. Until the training hour was added, all scheduled hours for each lab were unique to each lab (local hours) and assigned by the lab supervisor. When the training hour was added, 6 to 10 different times were allocated with 15 employees at each time. Each lab scheduled their students from these different times, however the hours used were not unique to each lab (global hours). In this case, the lab supervisor does not have control over the number of hours they can assign for training. If they do not schedule their employees in time, some training hours may be completely taken before they get a chance to schedule their own employees.

2.9 Additional Tools

Additional tools, added as suggestions, are made to help enhance the management and supervision of the employees. Some of these suggestions include: Estimated timesheets, and student worker leaders and representatives.

2.9.1 *Estimated timesheets*

At Computing and Information Services, estimated timesheets are used on occasion because of holidays and the end of the fiscal





year. This allows the employee to be paid on time when payroll may normally be closed. A form is printed and each lab supervisor fills out the estimated time each employee would work for a given week. Both the supervisor and the employee then sign the estimated timesheet.

By utilizing the scheduler, a form is printed that includes the employee's schedule. All that remains is signing the form. This process improves accuracy as well as saves time.

2.9.2 Student worker leaders and representatives

In order to recognize outstanding employees with leadership qualities, the SCC assigned student worker leaders. These employees would be responsible for backing up supervisors when the supervisors were not in the lab. The SCC also assigned student worker representatives. The full time staff selects two employees and the student workers elect two employees. These employees attend biweekly meetings to discuss lab, student worker, and other related issues.

Icons are assigned to each employee that is a graduate assistant, leader, or a representative. These icons are displayed in the weekly schedules and daily schedules, and are listed as follows:

- Graduate assistant – 
- Student leader – 
- Student representative, appointed – 
- Student representative, elected – 

In the daily schedules, the icons help provide information on how the lab is represented by leadership (see Table 4).

Table 4. View Daily Schedule – Leaders and Representatives

	Resource		First Floor		Second Floor	
	Info Desk	Desk	Help Desk #	Printer #1	Help Desk #	Printer #2
8am	<113:Kris>	115:Kristin	[👤079:Greg]	[👤081:Christina]	[👤033:Austin]	068:Kevin
9am	048:Robert [👤091]	<113>	[👤079]	[👤033] 068	115	116:Richard
10am	068 <113>	128:Athena	[👤033] [👤091]	048 115	085:Larkin	114:Dathan
11am	084:Sara 115	068	048 [👤091]	085 <113>	114	128
12pm	044:Juan	(001:Cynthia)	084 085	114 116:Richard	125	<113>
1pm	025:Paul 085	128	<113>	044 084	114	(001)
2pm	044 084	[👤023:Matt]	048:Robert <113>	(001) 085	025	103:Anu
3pm	(001) 103	[👤029:Andrew]	[👤023] <113>	(000:Mike) 048	025	084
4pm	[👤023] (👤066:Ken)	(001)	[👤029] (002:Court)	103 <113>	(000)	025

3. THE RESULTS

The scheduler is a tremendous success for both the employees and the supervisors. Because the scheduler is on the web, employees

can put in their schedule requests from home, even if home is the Virgin Islands.

Trading hours has improved the process for both employees and supervisors. With automatic e-mail notifications, employees and supervisors are able to keep track of schedule changes immediately.

With the help of the daily schedules, supervising the employees has been simplified. The supervisor can identify any scheduling problems for the day and make alternate arrangements. Also, every supervisor as well as every student worker uses the daily schedules to check that employees have arrived on time and checks to make sure they are at the correct station.

4. FUTURE DIRECTION

The scheduler program is currently written with a homegrown database system. This database system has limited the capabilities of the scheduler program because statistics are not easily attainable. Converting to a SQL database is the next logical step for the scheduler program. With this database, statistics can easily be produced to present information such as average number of hours worked, average number of hours given up, and average number of hours taken by an employee.

Once the database is converted, the interface for scheduling students can be improved. Currently, each employee is scheduled individually. Section 2.2 would work more efficiently if components of all three tools could be incorporated as one tool. Imagine being able to see where the weak areas are, and then schedule those employees immediately. If you had to exchange hours from one employee to another, it could be done in a matter of seconds.

The above improvements will allow easy analysis of employee productivity, reduce the time required to schedule employees, and enable the scheduler program to more easily incorporate additional features.

5. ACKNOWLEDGMENTS

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Columns on Last Page Should Be Made As Close As Possible to Equal Length