Emergency Notification System

Server-Based Emergency Notification

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Background

Customer needs and demands:

- Effective mass notification
- Reasonably low costs
- Ease of implementation

Survey Results

In a recent poll we conducted on random individuals in the Engineering building,

- 60% Have not signed up for HU Alert
- 40% Have signed up for HU Alert

Average hours per week spent in labs: 20.8 hrs

Reasons for not signing up:

- Charges to phone bill
- Never heard of it
- Don’t like filling out forms
- Don’t think they need it

Problem Formulation

Problem Definition: There is a need for more effective ways to inform students in Howard's Engineering Building of emergency situations on campus.

Overall Design Functional Requirement: Develop a server based notification system for Howard university Engineering building.

Constraints:

- System should enforce user interaction.
- Inform within 8-12 minutes of incident report.
- Use effective and reliable communication media
- Must notify individuals at client computer stations.

Design Requirement

OPERATION, COST AND MAINTENANCE

- System operation must require minimum technical know-how
- Estimated cost values are less than fifty dollars. This includes minute costs for on-network screen messages.
- Students do not have to sign up to get notifications
- System should initiate through the base station.
- Screen pop-up should run until terminated by user confirmation.

Design Constraint

REGULATIONS

- United Facilities Criteria for mass Notification Systems (4-021-01)
- Occupational Health and Safety Administration regulation(1910.165) for employers that use an alarm system
- IEEE Standard for Software Test Documentation (std. 829)
- IEEE Standard for Software Unit Testing (std. 1008)
- IEEE Standard Classification for Software Anomalies (std. 1044)
- IEEE Standard for Software Safety Plans (std.1228)

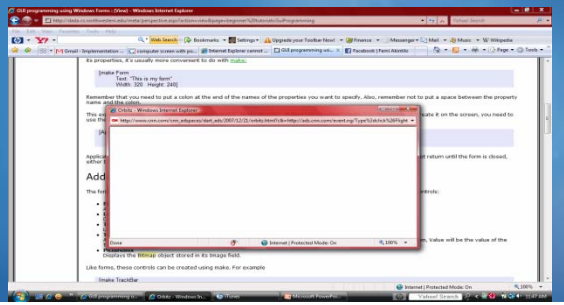
Solutions

- Wired Audio System

- Wireless Audio System: CB Radio

- Visual Display

- On-network messages (server based notification system)



Top Design Selection Process

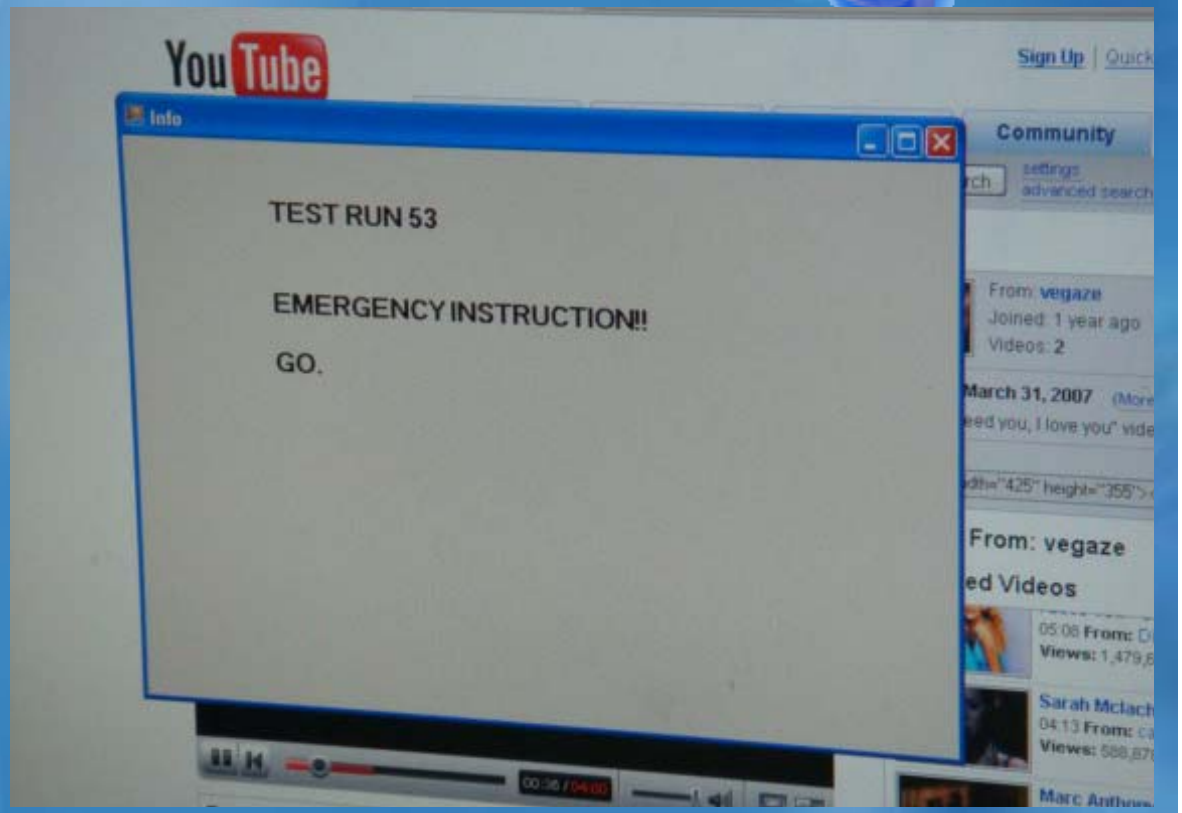
Decision Matrix

	Visual Display (Weight)	Audio System (Wireless)	On-Network Screen (weight)	Audio Systems (Weight)	Scale
Cost	4 (40)	7(70)	10 (100)	3 (30)	10
Reliable	7 (170)	8(200)	9 (225)	7 (175)	25
Ease of Implementation	5 (150)	7(210)	8 (240)	3 (90)	30
# people notified	5 (100)	8(160)	5 (100)	8 (160)	20
Ease of use	6 (90)	7(105)	9(135)	8(130)	15
Total	550	745	800	585	100

We changed the weights of our criteria to reflect the design requirements for our problem statement.

Top design

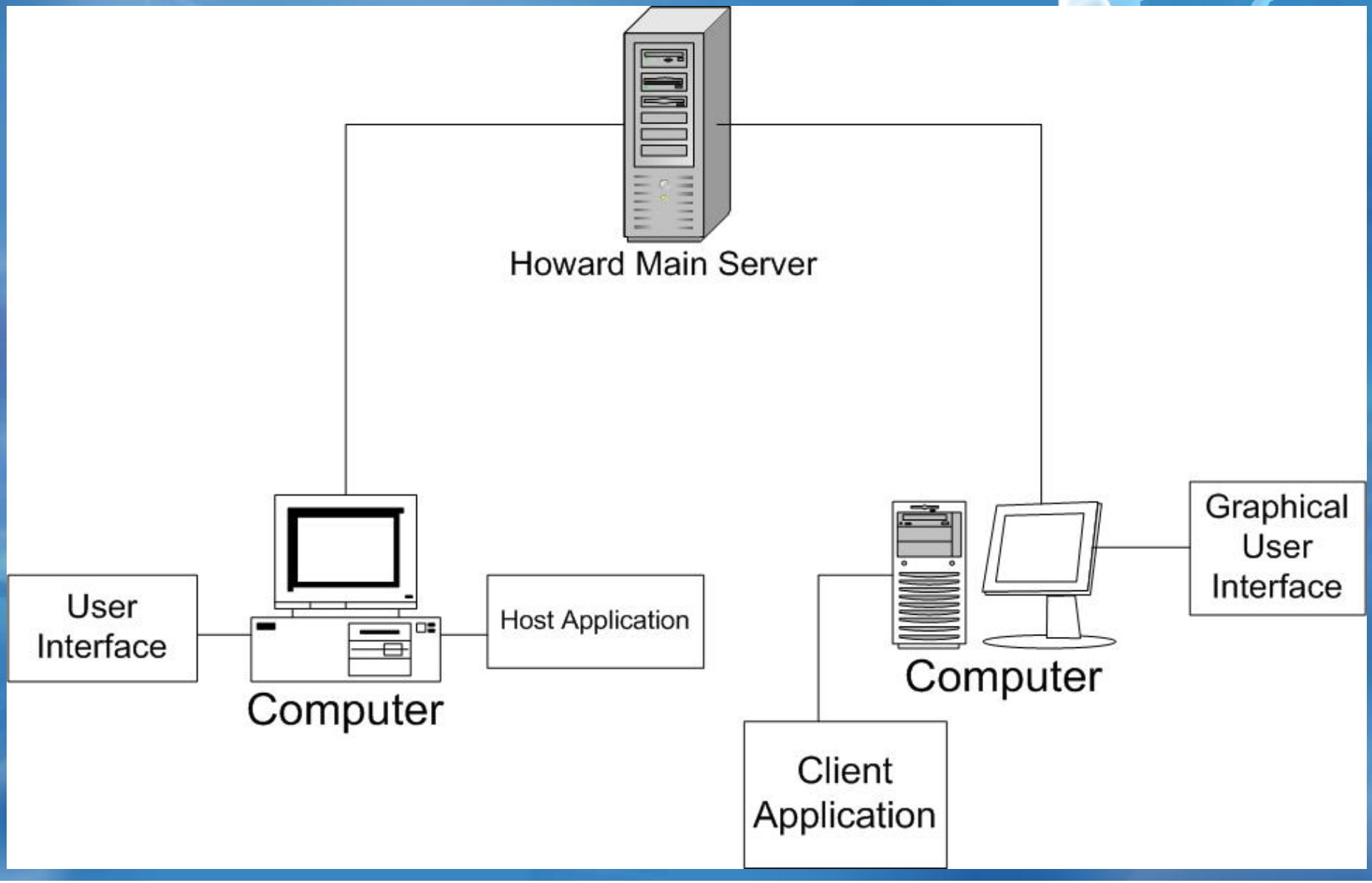
On-network messaging (server based notification system)



Advantages:

1. Innovative design.
2. Inexpensive.
3. Easy to use.
4. Interactive.

System Overview



Implementation

Breakdown of Tasks

- Build a Remote Server
- Build a Host Application
- Build a Client application
- User Interface (Client end)
- User Interface (Server end)

Issues and Concerns raised

- Firewalls within different networks in the engineering building
- Insufficient knowledge of programming language prior to start of project
- Administrative access to computers

Testing

Performance Criteria

- All clients logged in should receive message
- Message should always initiate from background
- Message should transmit within 3-5 seconds
- Successful program should run 90% of the time

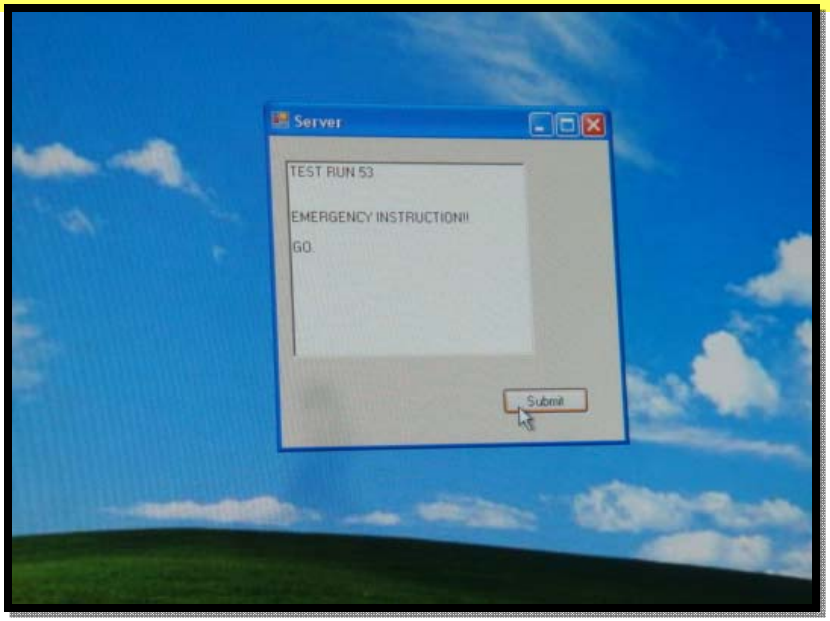
Testing results (50 trials):

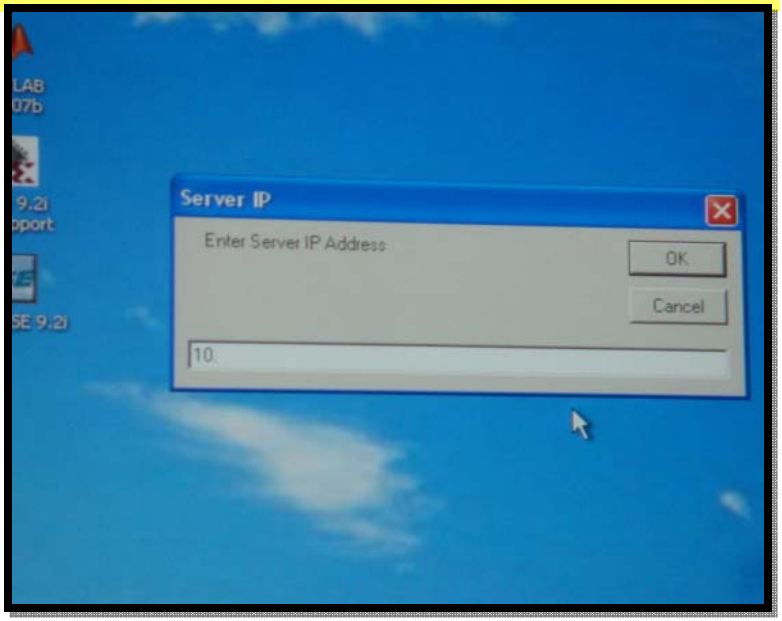
- 46 successful emergency transmissions
- 4 blocked due to lack of admin privileges
- 92% successfully transmitted

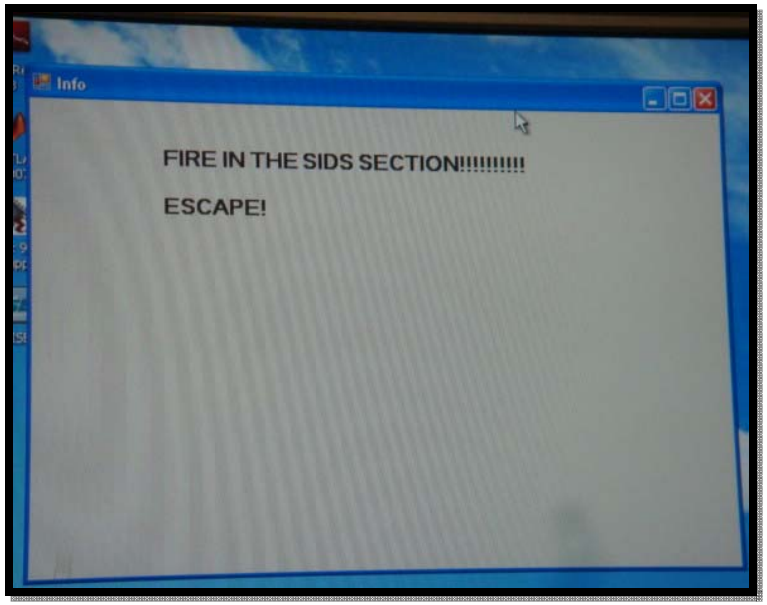
Per completed message:

- 100% logged in Clients received message
- 100% initiated from background
- 100% transmitted within 3-5 seconds

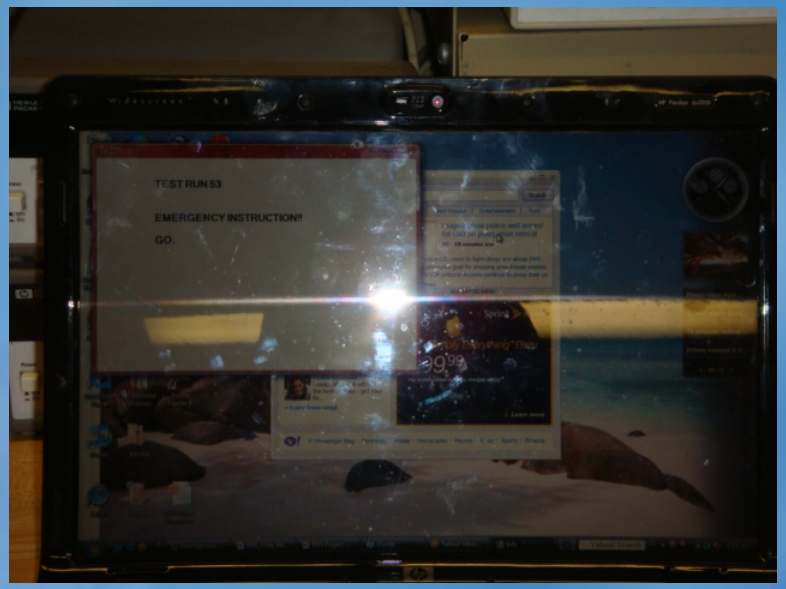
Testing Stages

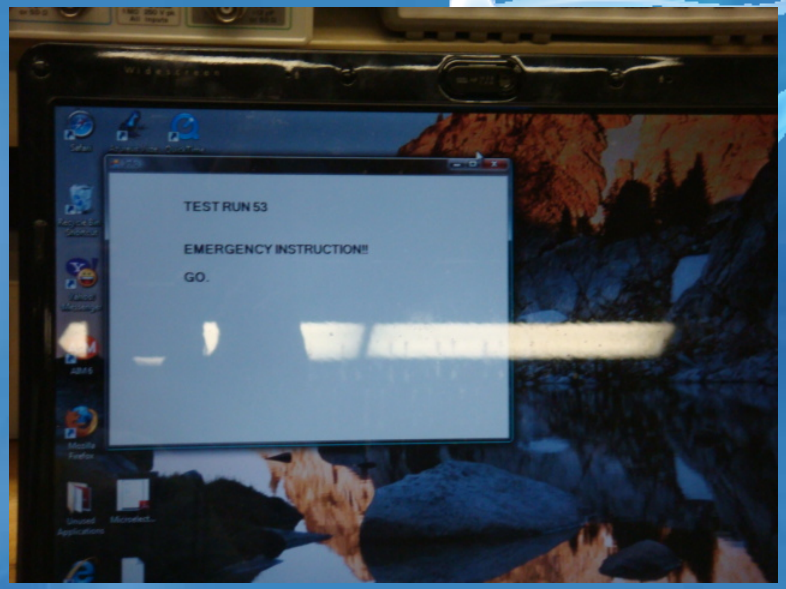


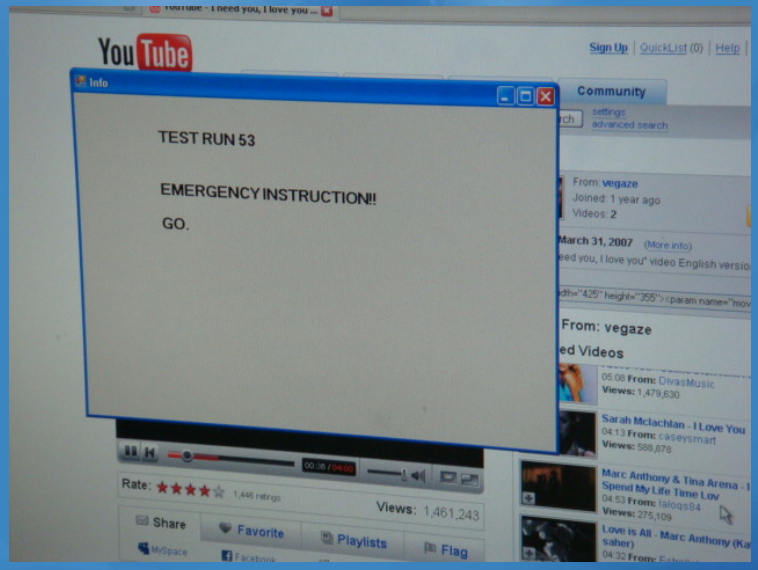




Testing - Continued

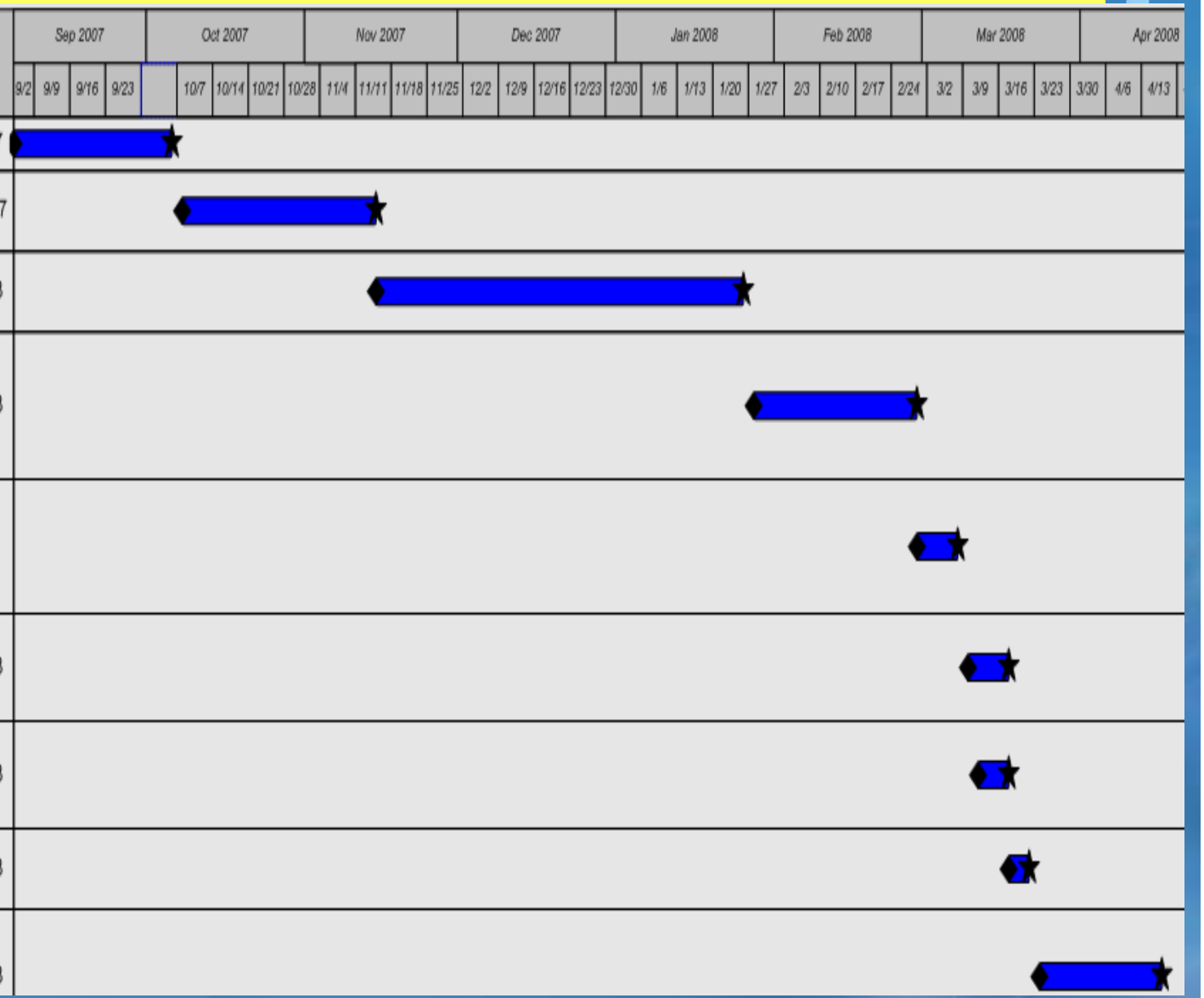






Timeline

ID	Task Name	Start	Finish
1	Research and survey	9/5/2007	10/5/2007
2	Proposal presentation and board review	10/8/2007	11/14/2007
3	Research, software structure, implementation plan	11/15/2007	1/25/2008
4	Re-evaluation of alternative solutions and choosing of top design. Building of UI	1/28/2008	2/28/2008
5	Building of remote server, client application	2/29/2008	3/7/2008
6	Building of Host application and server notification	3/10/2008	3/17/2008
7	Testing and integrating	3/12/2008	3/17/2008
8	Rebuilding	3/18/2008	3/21/2008
9	Retesting and Presentation for ECE day	3/24/2008	4/16/2008



Lessons Learned

- Team work
- Importance of communication and camaraderie among team members
- Importance and use of deadlines
- C# and .NET

CONCLUSION

- Dire need for an effective notification system among College and University campuses.
- Future Possibilities for Emergency Notification Systems.
- Design lifecycle: September 2007 – April 2008

Acknowledgements

We say a big thank you to the mentioned parties:

- EE Faculty
- Colleagues