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# Group Members

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- Amanda Chaffin – Environments and Database Specialist
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- Dimitris Koutsogiorgas – Web and GUI Designer
- Lenny Tran – Legal Expert
- Jann Nguyen – Non-Functional Requirements Analyst
  
- Sponsor: Daniel Binford, Systems Administrator for Mecklenburg County Board of Elections

# Purpose

- Secure, efficient, and accessible voting
- Easily updatable and financially sound
- Web-Based software designed for PC

# Hardware Systems

- Current systems are expensive
- Need to be completely replaced as laws evolve
- Chief cause of delays on election day

# Software-Based System

- Voters familiar with web browser
- Few moving parts for easy maintenance
- Software updates allow:
  - Flexibility
  - Cost-Efficiency

# Design Objectives

## Accessibility

- Conform to Help America Vote Act (HAVA)
- Multilingual support
- Accommodation for handicapped persons
  - Blow/puff mechanisms available
  - Vision impaired persons accommodated

## Cost-Effective

- Balance of quality and customer's expectations
- System upgradeable through software updates
- Open sourced platforms used to keep cost down

# Design Objectives

## Functional/Operational

- Straight party voting
- System integration of different voting schemes
- Provisional ballots
- Audit “fall-off” votes
- Ballots sorted using appropriate layouts
- Option to verify or change vote before submission
- Give warning when multiple candidates selected
- Vote audit allowed before permanent paper record produced

# Design Objectives

## Public Support

- Public needs to be convinced in order for system to be successful
- System designed with voters needs and concerns in mind
- Voter friendly
- Training available

## Security

- High-level security protocols used
  - RSA
  - Secure Sockets Layer
- System login using Smart-Card technology



# Machine Malfunctions

- Wrong district ballot
- Records votes incorrectly
- Passing pre-election testing and failing on Election Day

As with any electronic system, unfamiliarity with equipments, machine failures and malfunctions are expected problems.

# Public Opinion

- Must assure the public that it works
- Free of dramatic software and hardware problems
- Close monitoring of the Election process can convince public of system's security

# The Cost

- The Federal Help America Vote Act of 2002
- Mecklenburg will spend 7-8 million dollars
- Disabled accessible and has Voter Verified Paper Ballots will cost \$45 million
- Direct Record Electronic (touch screen or pushbutton digital voting machines) will cost \$145 million

# Environment

- Security issues
- Cost effectiveness
- Obeys the current laws
- Ease of use for
  - Administrators
  - Users



# Linux RedHat

## Security

- Hacks
- Viruses/Worms
- Port Control

## Cost effective

- GNU GPL
- Open source

Ease of use – a steeper learning curve means better documentation



# Apache Web Server

- Security
  - Built-in SSL
  - Permissions
  - Logs
  - Filters
  - Customizable configuration
- Cost effectiveness
  - Open source
  - GNU public license
- Ease of use
  - Initial set up
  - System runs itself



# Databases



- Customizable GUI
  - Uses PHP
  - Removes need to have a Database Manager
  - Better documentation
  - Can be configured at will
- Less security risks than SQL and Enterprise Manager
- Follows ANSI standards
- Open source and under GNU license

# Thin Clients

- Internet compatible
- Smart Card technology compatible
- Two choices
  - Mouse and monitor
  - Touch screen monitor





# The Three Components

- Ballot Creation Software
- Desk One (Registration Verification)
- Desk Two (Ballot Box)

# Desk One

- Check in
- Receive Smart Card
- Go vote





# Database GUI – con't

Add and remove voters easily and quickly

The screenshot shows a web browser window titled "Vote Online". The browser's address bar shows "Tahoma" and the page number "8". The browser's menu bar includes "File", "Edit", "View", "Insert", "Format", "Records", "Tools", "Window", and "Help". The browser's toolbar contains various icons for navigation and editing. The main content area is divided into two sections: a form for adding a voter and a table of existing voters.

The form, titled "Voter Registration Database", has the following fields:

- Last Name:
- First Name:
- Middle Name:
- Address:
- City:
- State:
- Postal Code:
- Birthdate:

Below the form, there are navigation buttons for "Record: 1 of 24".

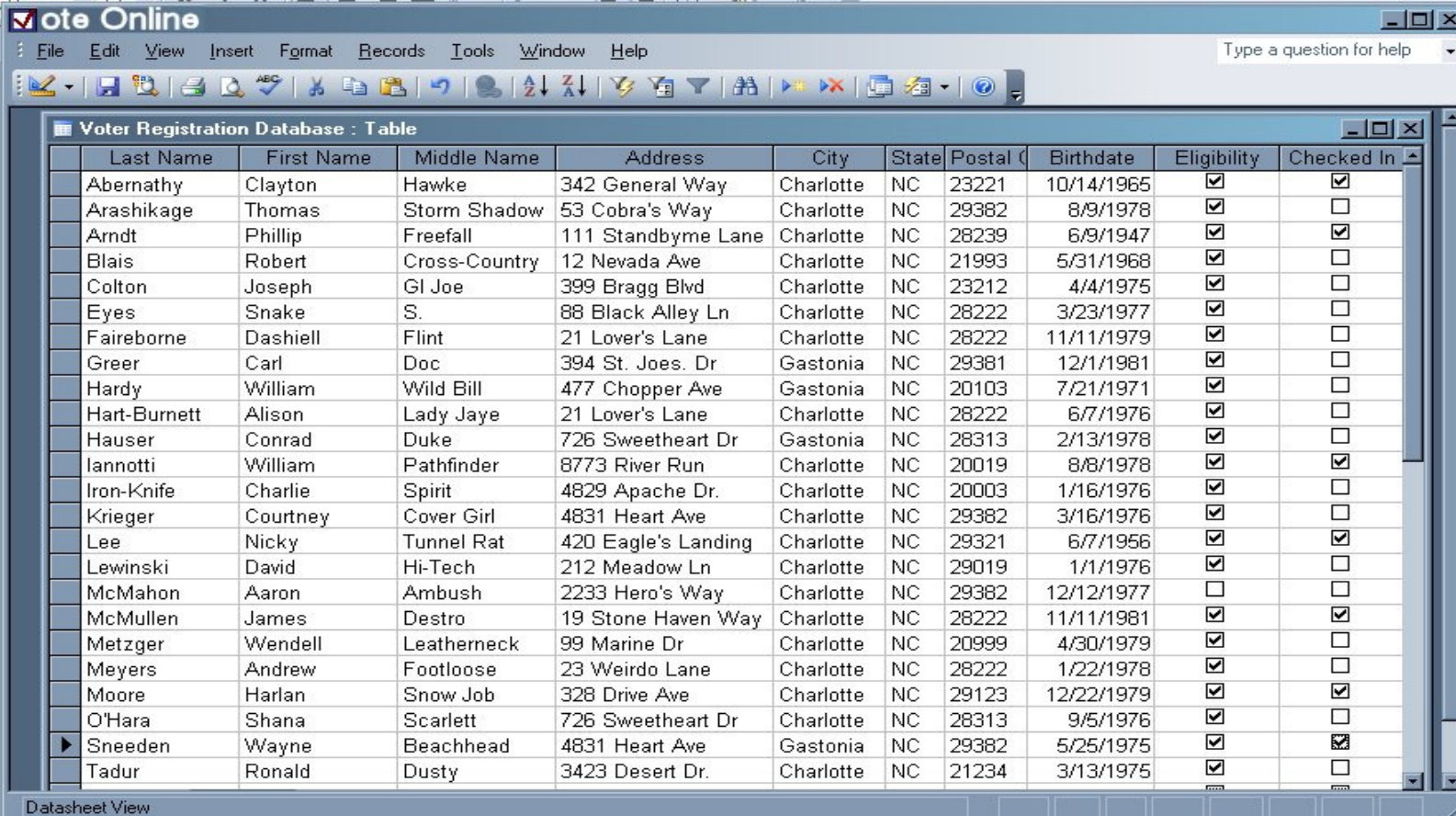
The table of existing voters has the following columns: "State", "Postal C", "Birthdate", "Eligibility", and "Checked In". The table contains 24 rows of data, with the first 10 rows partially visible in the screenshot.

	State	Postal C	Birthdate	Eligibility	Checked In
e	NC	23221	10/14/1965	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
e	NC	29382	8/9/1978	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e	NC	28239	6/9/1947	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
e	NC	21993	5/31/1968	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e	NC	23212	4/4/1975	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e	NC	28222	3/23/1977	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e	NC	28222	11/11/1979	<input checked="" type="checkbox"/>	<input type="checkbox"/>
a	NC	29381	12/1/1981	<input checked="" type="checkbox"/>	<input type="checkbox"/>
a	NC	20103	7/21/1971	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e	NC	28222	6/7/1976	<input checked="" type="checkbox"/>	<input type="checkbox"/>
a	NC	28313	2/13/1978	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e	NC	20019	8/8/1978	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
e	NC	20003	1/16/1976	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e	NC	29382	3/16/1976	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e	NC	29321	6/7/1956	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
e	NC	29019	1/1/1976	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e	NC	29382	12/12/1977	<input type="checkbox"/>	<input type="checkbox"/>
	NC	28222	11/11/1981	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	NC	20999	4/30/1979	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	NC	28222	1/22/1978	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	NC	29123	12/22/1979	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	NC	28313	9/5/1976	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	NC	29382	5/25/1975	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

At the bottom of the screenshot, there is a "Form View" button.

# Database GUI – con't

The filled database with print capability



The screenshot shows a window titled "Vote Online" with a menu bar (File, Edit, View, Insert, Format, Records, Tools, Window, Help) and a toolbar. Below the toolbar is a table titled "Voter Registration Database : Table". The table has the following columns: Last Name, First Name, Middle Name, Address, City, State, Postal Code, Birthdate, Eligibility, and Checked In. The data is as follows:

Last Name	First Name	Middle Name	Address	City	State	Postal Code	Birthdate	Eligibility	Checked In
Abernathy	Clayton	Hawke	342 General Way	Charlotte	NC	23221	10/14/1965	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Arashikage	Thomas	Storm Shadow	53 Cobra's Way	Charlotte	NC	29382	8/9/1978	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Arndt	Phillip	Freefall	111 Standbyme Lane	Charlotte	NC	28239	6/9/1947	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Blais	Robert	Cross-Country	12 Nevada Ave	Charlotte	NC	21993	5/31/1968	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Colton	Joseph	GI Joe	399 Bragg Blvd	Charlotte	NC	23212	4/4/1975	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Eyes	Snake	S.	88 Black Alley Ln	Charlotte	NC	28222	3/23/1977	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Faireborne	Dashiell	Flint	21 Lover's Lane	Charlotte	NC	28222	11/11/1979	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Greer	Carl	Doc	394 St. Joes. Dr	Gastonia	NC	29381	12/1/1981	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Hardy	William	Wild Bill	477 Chopper Ave	Gastonia	NC	20103	7/21/1971	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Hart-Burnett	Alison	Lady Jaye	21 Lover's Lane	Charlotte	NC	28222	6/7/1976	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Hauser	Conrad	Duke	726 Sweetheart Dr	Gastonia	NC	28313	2/13/1978	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Iannotti	William	Pathfinder	8773 River Run	Charlotte	NC	20019	8/8/1978	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Iron-Knife	Charlie	Spirit	4829 Apache Dr.	Charlotte	NC	20003	1/16/1976	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Krieger	Courtney	Cover Girl	4831 Heart Ave	Charlotte	NC	29382	3/16/1976	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Lee	Nicky	Tunnel Rat	420 Eagle's Landing	Charlotte	NC	29321	6/7/1956	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Lewinski	David	Hi-Tech	212 Meadow Ln	Charlotte	NC	29019	1/1/1976	<input checked="" type="checkbox"/>	<input type="checkbox"/>
McMahon	Aaron	Ambush	2233 Hero's Way	Charlotte	NC	29382	12/12/1977	<input type="checkbox"/>	<input type="checkbox"/>
McMullen	James	Destro	19 Stone Haven Way	Charlotte	NC	28222	11/11/1981	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Metzger	Wendell	Leatherneck	99 Marine Dr	Charlotte	NC	20999	4/30/1979	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Meyers	Andrew	Footloose	23 Weirido Lane	Charlotte	NC	28222	1/22/1978	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Moore	Harlan	Snow Job	328 Drive Ave	Charlotte	NC	29123	12/22/1979	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
O'Hara	Shana	Scarlett	726 Sweetheart Dr	Charlotte	NC	28313	9/5/1976	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sneeden	Wayne	Beachhead	4831 Heart Ave	Gastonia	NC	29382	5/25/1975	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tadur	Ronald	Dusty	3423 Desert Dr.	Charlotte	NC	21234	3/13/1975	<input checked="" type="checkbox"/>	<input type="checkbox"/>

# Thank You!

- Any Questions?