

“The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any state on account of [race, color, or previous condition of servitude, sex, reason of failure to pay any poll tax or other tax, age (above 18)]”

– US Constitution

“The people who cast the votes don't decide an election the people who count the votes do”

– Joseph Stalin

Need the following

Voter-verifiability: I can check that my own vote is in the (virtual) ballot box

Universal verifiability: anyone can check that the ballot box is counted correctly

Without:

revealing anyone's vote

trusting polling machines/officials

We also want

To **compare** voting systems with respect
to integrity and privacy

To make verifiability **accessible**

GW-Voting

Universal and voter-verifiable voting systems

- *Citizen Verified Voting* 2004
 - First non-commercial implementation
- Inter-university system *PunchScan**
 - Grand prize, *VoComp* 2007
 - First to be used in binding election, 2007
- Inter-university system *Scantegrity*♦
 - only voter-verifiable system with familiar optical-scan user interface

*with David Chaum, UMBC, UOttawa, UWaterloo

♦with David Chaum, UMBC, UOttawa, UWaterloo, MIT, Newcastle Univ.

GW-Voting

Voting system properties: in progress

- Possible to have both integrity and privacy?
 - What are the mathematical constraints?
- How much privacy do voting system designs provide?

GW-Voting

Accessible voter-verifiability: in progress

To provide voter verifiability for voters
with disabilities

Mock Election

- What: Mock election for international students using *Scantegrity*
- When: November 4th, 10 - 7pm
- Where: H street terrace

Marvin Center, GW
800 21st Street, N.W.

Today we will demonstrate *Scantegrity**

*Developed in collaboration with:

David Chaum (chief inventor), UMBC, UOttawa, UWaterloo, MIT,
Newcastle University

4711

President

☐ Alice

☐ Bob

☐ Carol

☐ David

4711

4711
President

☐ Alice

☒ K4W Bob

☐ Carol

☐ David

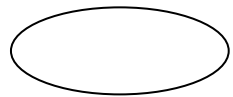
4711
K4W

The special pen used to mark the oval reveals a confirmation code for the marked candidate

The voter writes down the confirmation code

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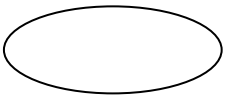
President



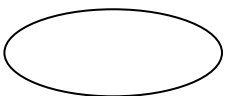
Alice



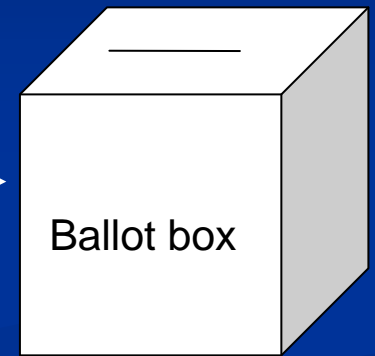
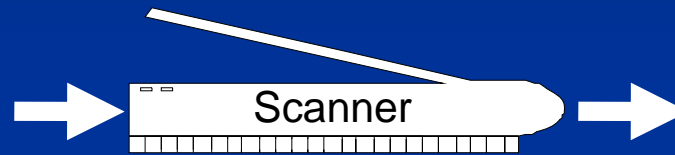
Bob



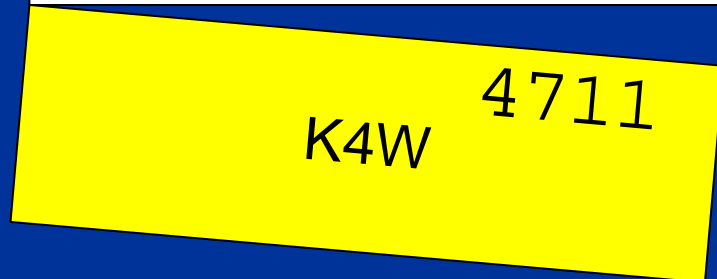
Carol



David

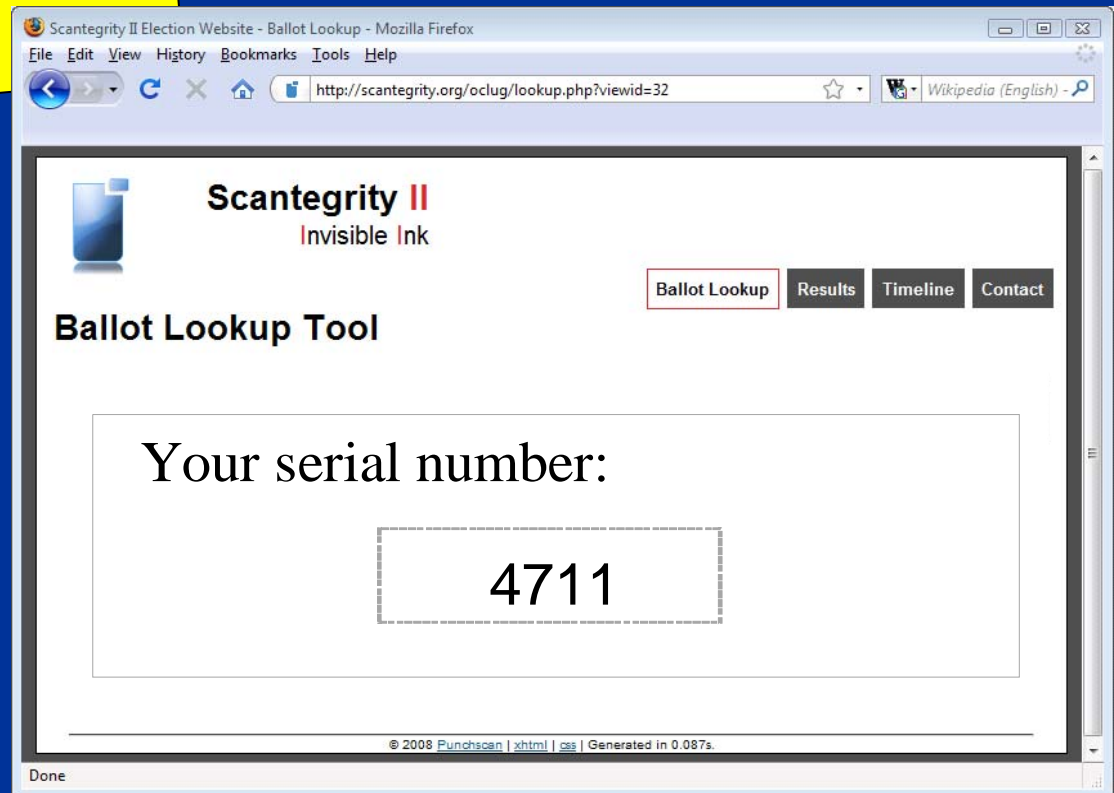


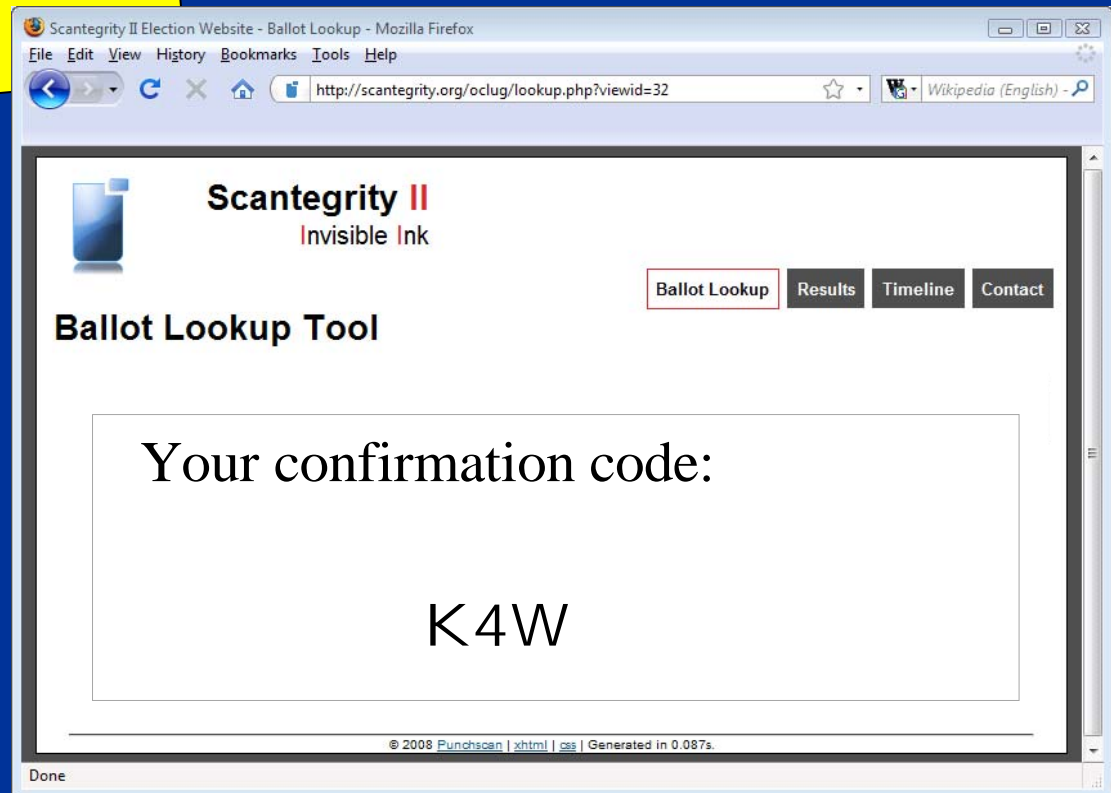
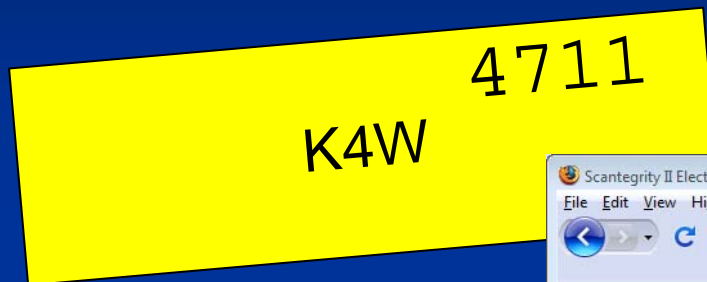
Ballot box





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“I promise to run the election
correctly”



Voters hold officials to their promises.

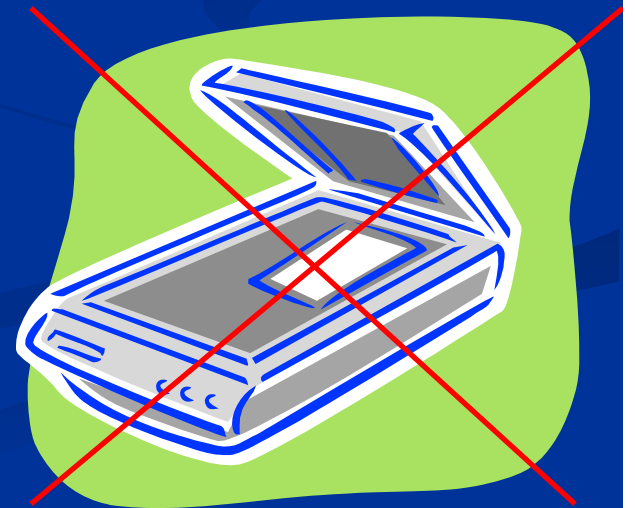


Voters perform checks and balances for each cast vote.



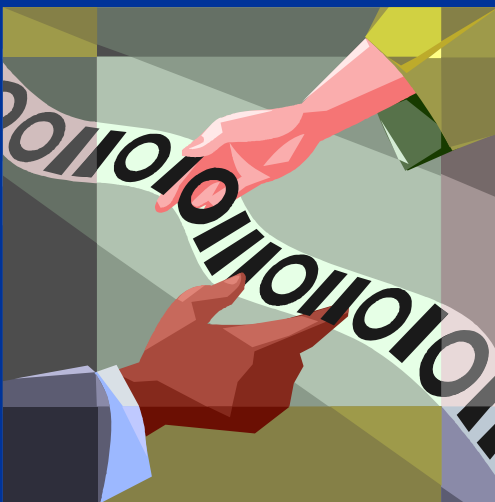


Check the election,
not the equipment





Software independent,
Data dependent



In God we trust,
everyone else bring data

Secure by design



Research Directions

- Use of *Scantegrity* in public elections
- Pushing the envelope of voter-verifiability and usability/accessibility
- Developing a performance evaluation framework for voting systems

Thank you !

Election Official:

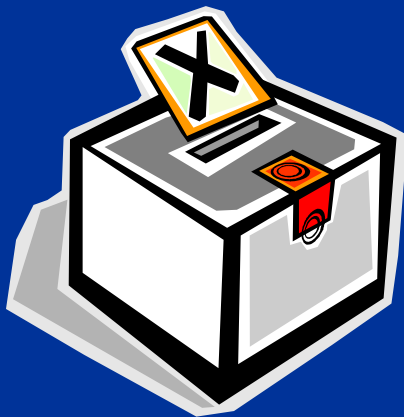
“I promise to run the election correctly”



In *Scantegrity*, the promise is mathematical: “your confirmation code is in the box and will get decoded to your vote”



Voters hold officials to their promises



by checking if the
confirmation code is online



Voters hold officials to their promises

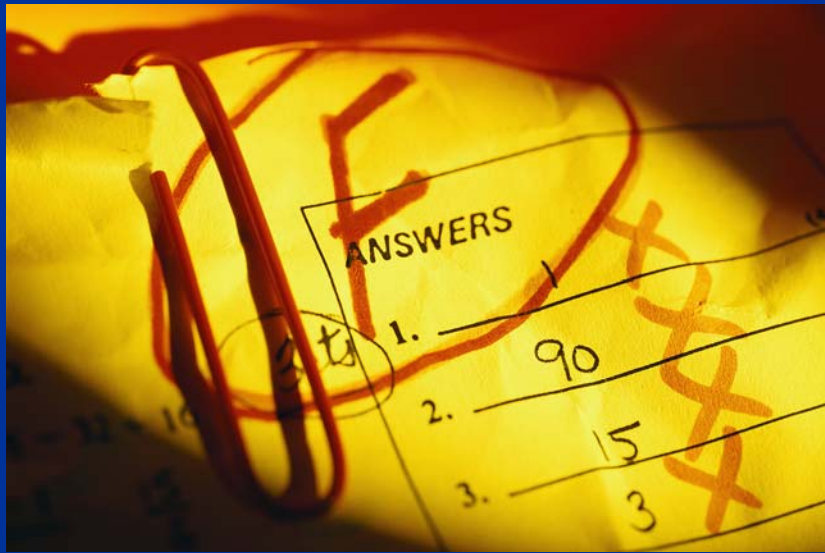
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= Bob?

by deciding to audit a
ballot instead of
casting it.



Anyone can hold officials to their
promises



by double-checking
the math