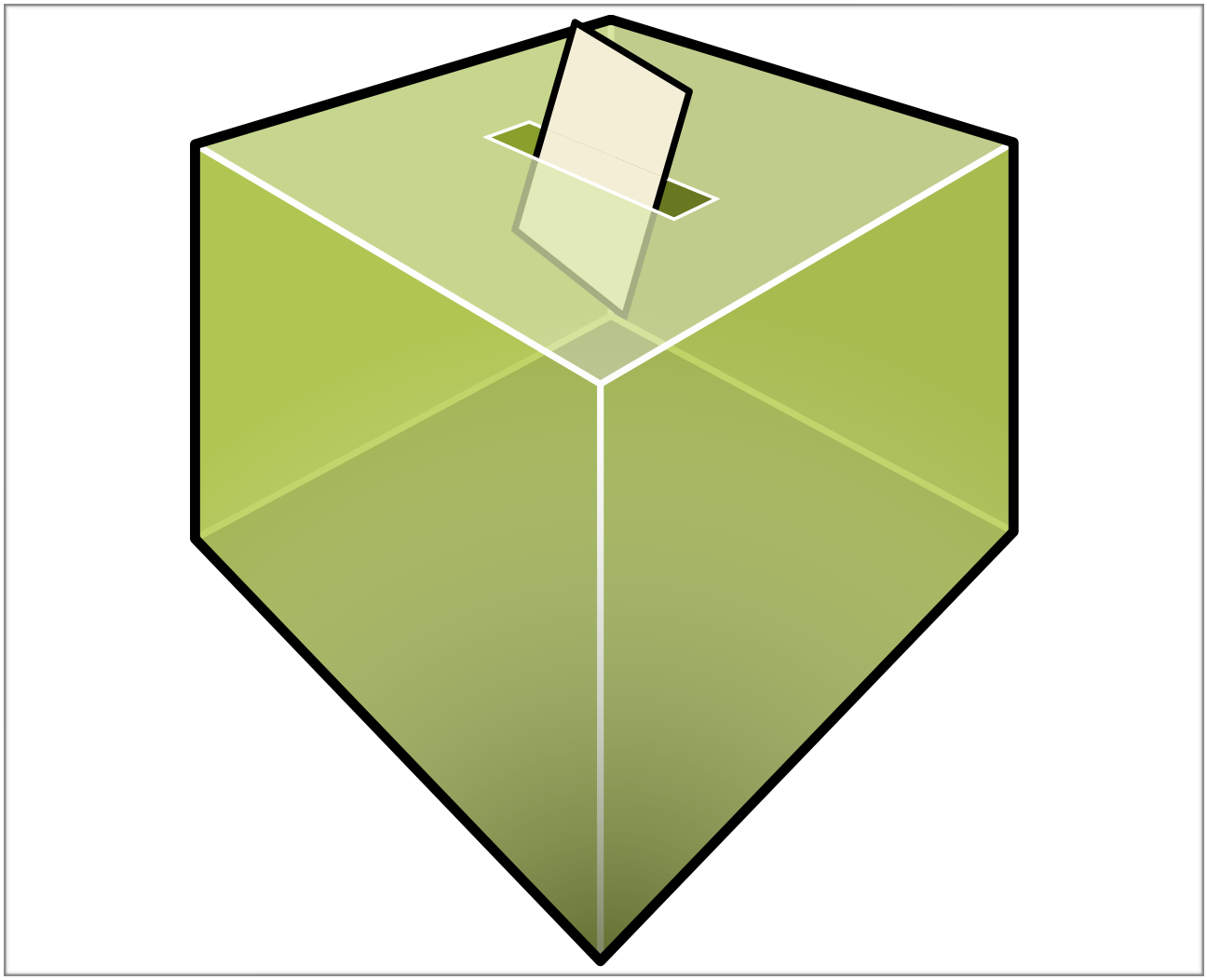

Votes!

JavaEE Web Applications 2014

Course Project

Version 1.0, Dienstag, 27. Mai 2014

The election box graphic used as project logo is free clipart from clker.com published under creative commons CC0 dedication.
http://www.clker.com/clipart-election-box.html
http://creativecommons.org/publicdomain/zero/1.0/

TABLE OF CONTENTS

VOTES!
SYSTEM VISION

The Votes!-System supports electronic polls. The system shall be used mainly by university bodies such as the examination office (Prüfungsausschuss). Many decisions in such bodies are made by polls. Since a common meeting is often hard to organize due to crowded schedules of participants, a voting system accessible via the Web is desirable.

Any member of the university must be able to define and conduct a voting. This role shall be called *organizer*. Participants, i.e. the people making a choice, need not be member of the university.

The system shall support different types of polls, such as yes-no, one of n options, m of n options.

Voters must be able to abstain from voting (vote void, ungültige Stimme oder Enthaltung). Depending on the decision mode (absolute majority relative majority, simple majority), void votes are counted differently.

Participants of a voting get a token, e.g. a transaction number, via E-Mail. This token represents their ballot paper (Wahlschein). The system must ensure anonymity. At no point in time, the person submitting a ballot must be connectable to her voting.

However, some administrative procedures require that the system keeps track of who has voted and who didn't participate. The organizer can decide if such tracking is required. Optionally, the voting system can send reminder mails to voters who did not yet participate.

Once a voting has been started, nobody can change the options and the participant list any more. After the voting deadline expires, the organizer can view the results. To ensure anonymity, the results may not be shown when an identification of a participant is possible (e.g. when tracking is enabled, and only one participant submitted her decision).

A graphical representation of the results, e.g. as a bar chart or pie chart, would be nice. For subsequent polls, an organizer should be able to record participant lists. The lists can easily be reused when the same participants occur many times, a usual situation in university bodies.

Assumptions

It is assumed that the operating environment of the Votes server is secured so that only trusted personnel can gain access to hardware, server software and databases.

Organizers are nice guys. They won't cheat. This means that participant lists are not manipulated (e.g. multiple E-Mail addresses per person).

VOTES!
REQUIREMENTS

This requirements list contains verb denoting obligations must, shall, and can. All requirements marked with must have to be fulfilled without exceptions. Requirements marked with shall have to be fulfilled when there is no major obstacle (e.g. external conditions hat can not be changed without huge effort). Requirements marked with can are optional - „nice to have“ - and may be fulfilled.

Functional Requirements

1. Polls

1.1. The system must support electronic polls with one or more items. MANDATORY

1.2. Each poll must have a title. The title has to be unique (scope is system). MANDATORY

1.3. Each poll must have a description. MANDATORY

1.4. Each poll must have a voting period (start and end date with time). MANDATORY

1.5. Each poll must have at least one item. MANDATORY

1.6. The system must allow to group arbitrary many items into one poll. MANDATORY

2. Poll states

2.1. The system must implement poll states. Polls be in one of four states: PREPARED, START-ED, VOTING, FINISHED. State changes are specified in figure XXX. MANDATORY

2.2. When all participants submitted their votes, the system must set the poll to FINISHED. MANDATORY

2.3. An organizer must be able to extend the voting period when a poll is in state STARTED or VOTING. OPTIONAL

3. Organizers

3.1. The system must allow all university members to act as organizers. MANDATORY

3.2. Organizers must identify themselves with username and password. MANDATORY

3.2.1. University members can be identified by the LDAP service provided by the GHRKO computing center. OPTIONAL

3.2.2. If LDAP is not used, an administrator must be able to create organizer accounts. OP-TIONAL

3.3. An organizer must be able to conduct arbitrary many polls. MANDATORY

3.4. The system shall provide a preview mode that allows organizers to view how their polls look like when a participant fills in her choices. OPTIONAL

3.5. The system can provide a possibility to add further organizers to a poll. Each organizer must have the same options. OPTIONAL

3.5.1. An organizer must be able to change the organizer list.

3.5.2. An organizer must not be able to remove herself from the organizer list.

4. Administrators

4.1. The system must support an administrator role. OPTIONAL

4.2. Administrators must have the ability to delete polls (including all votes) from the system. OPTIONAL

4.3. Administrators must not be able to view votes nor results of polls which they didn't organize. OPTIONAL

4.4. Administrators must be able to create and delete user accounts, if no LDAP authentication is provided (see requirement XXX). OPTIONAL

5. Participants

5.1. The organizer of a poll must be able to invite 3 to arbitrary many participants. In polls with less than 3 participants, anonymity can not be asserted. MANDATORY

5.2. Each participant must be identified by her email address. MANDATORY

5.3. The system shall support participants from outside the university. OPTIONAL

5.4. After a poll is STARTED by the organizer, each participant must be informed via email about the poll. OPTIONAL (University mail server must not be „mis-used", it's sufficient to display the mail content on a web page)

5.5. The information mail must include the title of the poll, the start and end dates, the number of participants, and a token. MANDATORY

5.6. The information can also contain a hyperlink immediately referring to the voting page with a pre-filled token field. OPTIONAL

6. Participant lists

6.1. The organizer must be able to modify the participant list until a poll is STARTED. MANDATORY

6.2. The system can provide a means to comfortably create participant lists, e.g. by pasting email addresses from other applications such as spread sheets or KLIPS. OPTIONAL

6.3. The system shall provide a means to store participant lists for easy reuse in subsequent polls. OPTIONAL

6.3.1. The stored participant lists must be private to each organizer.

6.3.2. Each stored participant list must have a unique name (scope is per organizer).

7. Tokens

7.1. The token must be randomly chosen. MANDATORY

7.2. The token must be unique (scope is system). MANDATORY

7.3. The token must be long enough to make it very very improbable that anybody can forge a valid token. MANDATORY

8. Anonymity

8.1. The system must ensure anonymity. MANDATORY (with reasonable effort)

8.2. At any point in time it must be impossible to identify which participant submitted which vote. This also must to be guaranteed for polls with participation tracking. MANDATORY

8.3. The system must ensure that a token can not be associated with a vote. MANDATORY

9. Participation tracking

9.1. The system must provide an option to enable participation tracking for a poll. OPTIONAL

9.2. The system can provide an option to configure automatic reminders via E-Mail. OPTIONAL

10. Submitting a vote

10.1. The system must provide a web page to submit a vote. MANDATORY

10.2. The voting page must present an input field for a participant's token. MANDATORY

10.3. The token input field can be pre-filled (see requirement XX). OPTIONAL

10.4. After the token was verified, the system must display the items. MANDATORY

10.5. The system must present a button to submit a vote. MANDATORY

10.6. After a vote was submitted, the token used for that vote must be invalidated (i.e. it can't be re-used, participants can not change their vote after submitting). MANDATORY

10.7. The system must allow to cancel a voting (e.g. by closing the browser, or by clicking a cancel button). MANDATORY

10.8. The token used in cancelled voting must be re-useable later. MANDATORY

10.9. For a cancelled voting, the system must not remember any of the choices. OPTIONAL

10.10. The system shall ensure that subsequent participants using the same browser window can not restore the previous choice (e.g. by the „go back“ function or by auto fill capabilities of browsers). OPTIONAL

11. Abstain from voting

11.1. The system must provide a means to abstain from voting (Enthaltung oder ungültige Stimme) for each item of a poll. MANDATORY

11.2. The system can provide a means to abstain from voting for a complete poll (this is equivalent to abstaining from all items). OPTIONAL

12. Types of items

12.1. The system must support different types of items. MANDATORY

12.2. The items of a poll must have a title (titles have to be unique with scope poll). MANDATORY

12.3. The options of an item must have a short name and a description. MANDATORY

12.4. The system must support **YES/NO** items. In this case, the short names of the options are „yes“ and „no“. MANDATORY

12.5. The system must support **1 OF N** items. Participants can choose exactly one of zwo or more options. MANDATORY

12.6. The system must support **M OF N** items. Participants can choose at most M of two or more options (M≤N). OPTIONAL

12.7. The system can support 1 OF N items with a free text option. Participants can choose one of the predefined options. Alternatively, they can enter a free text to indicate their choice. OPTIONAL

12.8. The system can support M OF N items with up to M free text options. Participants can choose at most M of the predefined options. Alternatively, they can can use less than M predefined options an enter the rest of their choices into free text fields. OPTIONAL

13. Results

13.1. An organizer must be able to view the results of a poll after the voting period is FINISHED. MANDATORY

13.2. Nobody must be able to view (intermediate) results in the STARTED and VOTING states. MANDATORY

13.3. The system shall provide a means to publish results (e.g. by sharing a hyperlink). OPTIONAL

13.4. The system must not show results of polls with less than 3 submitted votes. MANDATORY

13.5. The results view must show the number of votes for each option of each item of a poll, as well as the number of abstentions. MANDATORY

13.6. The system can display the results in graphical form (e.g., as pie chart). OPTIONAL

Non-Functional Requirements

14. User interface

14.1. The system can use third-party CSS libraries (such as Twitter Bootstrap) to achieve a modern look and feel. OPTIONAL

14.2. The system can use advanced technologies (e.g. AJAX, JavaScript) to enhance user experience. OPTIONAL

14.3. The system can use third-party JSF components (e.g. myFaces, richFaces). OPTIONAL

14.4. The system must provide a user interface suitable for desktop/laptop browsers. MANDATORY

14.5. The user interface can support multiple devices (desktop, tablet, mobile, etc.). OPTIONAL

14.6. The user interface must be realized with JSF. MANDATORY

15. Security, encrypted communication

15.1. The system must store passwords in encrypted form (unless LDAP is used for identification). MANDATORY

15.2. All communication of the voting system with its users (administrators OPTIONAL, organizers, participants) shall be encrypted (HTTPS protocol).

15.3. The communication of the voting system with the database server can be encrypted. OPTIONAL

16. Internationalization

16.1. The voting system must provide a user interface in one of the two languages German or English. OPTIONAL

16.2. The voting system can provide a means to change the user interface language. OPTIONAL

16.3. The language switch can be done by detecting the client browser language settings. OPTIONAL

16.4. The language switch can be done by clicks to icons or links. OPTIONAL

17. Browser support

17.1. The system must support at least one of the following web browsers: FireFox, Safari, Chrome in the most recent stable version available at delivery of the project. MANDATORY

Glossary

A...

administrator
: a user role in the system. Users with this role can create organizer accounts.

abstain (from voting)
: Participants must have the option to abstain from voting (sich enthalten) for each item of a poll, or for a complete poll. When a participant chooses to abstain, her decision may influence the result of a poll, depending on the decision mode. When a participant chooses to abstain, her vote is taken into account when computing the voter participation value (Wahlbeteiligung).

D...

decision mode
: The decision mode of a poll can be one of three modes:
absolute majority: an option is accepted if more than 50% of the participants voted for that option
relative majority: an option is accepted if more than 50% of the votes indicate that option
simple majority: an option is accepted if it has more votes than all others

I...

item (of a poll)
: TODO

O...

option (of an item)
: TODO

organizer
: TODO

P...

participant
: TODO

participation tracking
: TODO

poll
: TODO

T...

token
: TODO

V...

void (vote)
: same as abstain

vote
: TODO

voter
: A participant who submitted a vote.

voter participation
: The voter participation (Wahlbeteiligung) is the ratio of total number of voters to total number of participants. The voter participation has to be computed for each item of a poll.

Notes from brainstorming meeting

(Software Lifecycle)

1. Problemstellung analysieren —> Vision und Studie
2. Anforderungen erheben —> Anforderungsliste und Szenarien
3. Architektur entwerfen und Bausteine spezifizieren —> Spezifikation
4. Implementieren, Integrieren und Validieren des Systems —> fertiges System
5. System installieren —> System in der Zielumgebung
6. Betreiben und Warten des Systems

Übergreifend: Dokumentieren, Projektmanagement, Qualität sichern

Problemstellung

System zur Durchführung von elektronischen Wahlen

Stakeholder

- Auftraggeber
- Hersteller
- Benutzer

- Administrator: Accounts anlegen

Wähler: Stimme abgeben

Organisatoren: Wahlen konfigurieren (erstellen/ändern) und auswerten

Benutzerdatenbank (LDAP) des Uni-Rechenzentrums soll verwendet werden

Wähler sollen eine Wahlschein erhalten. Es sollen auch Personen außerhalb der Uni wählen können.

Die Wähler sollen anonym bleiben, bei manchen Wahlen soll man feststellen können, wer abgestimmt hat.

Die Wahlergebnisse sollen erst nach der Wahl einsehbar sein. Das bedeutet, dass die Stimmabgabe nur in einem vorher bestimmten Zeitraum möglich ist.

Die Wahlergebnisse sollen nur durch den Organisator mit den Kandidaten (bzw. Optionen) in Verbindung gebracht werden können. Nach dem Beginn der Stimmabgabe dürfen das Wählerverzeichnis und die Optionen nicht mehr verändert werden. Einmal abgegebene Stimmzettel dürfen nicht mehr verändert werden.

Für Gremienarbeit sollen die Organisatoren Wählerlisten speichern können, damit nicht bei jeder Wahl der Organisator die Wähler neu zusammenstellen muss.

Die Stimmabgabe soll nur mit verschlüsselten Verbindungen (HTTPS) möglich sein.

Arten von Wahlen:

- Ja/Nein-Abstimmungen
- Eine (1) aus n Optionen
- m aus n Optionen
- eigene Optionen (also etwa A, B, C und zwei Freitexte)
- Enthaltungen und ungültige Stimmen müssen möglich sein

Mehrere Abstimmungen sollen in einer Wahl zusammengefasst werden können.