Short, Undeniable Signatures for Android 2.x

Master Semester Project

Sebastien Duc

EPFL

June 15, 2012

Outline

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Introduction (1)

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- MOVA is an undeniable signature scheme.

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- The aim of the project was to design an application for Android using MOVA.

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- It is not the case for undeniable signatures (and MOVA).
- We tried to find an application where undeniable signatures can bring something.

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- The verifier must run an interactive protocol with the signer

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Confirm Interactive protocol between S and V to confirm the validity of (m, σ).

Deny Interactive protocol between S and V to deny the validity of (m, σ').

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- Scheme based on group homomorphism.

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Public key: $(G, H, |H|, seedK, Ykeys)$
Secret key: h

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Signature: $Ysigs$

Group Interpolation

Definition

We say the $S \subseteq G \times H$ interpolates in a group homomorphism if $\exists$ a homomorphism h st. $h(x) = y \ \forall (x, y) \in S$.

Note: In MOVA we consider sets S that interpolates in a unique group homomorphism.

Verification

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The prover convinces the verifier that

$$\{(Xkey_i, Ykey_i) | i = 1, ..., Lkey\} \cup \{(Xsig_i, Ysig_i) | i = 1, ..., Lsig\}$$

interpolates in a group homomorphism.

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- Verify all the signatures in only one protocol call.

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- The concept is similar to the University Challenge in the UK, but using phones.

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- The university with the highest score wins the contest.

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- Correction and scoring is done manually by the server manager.

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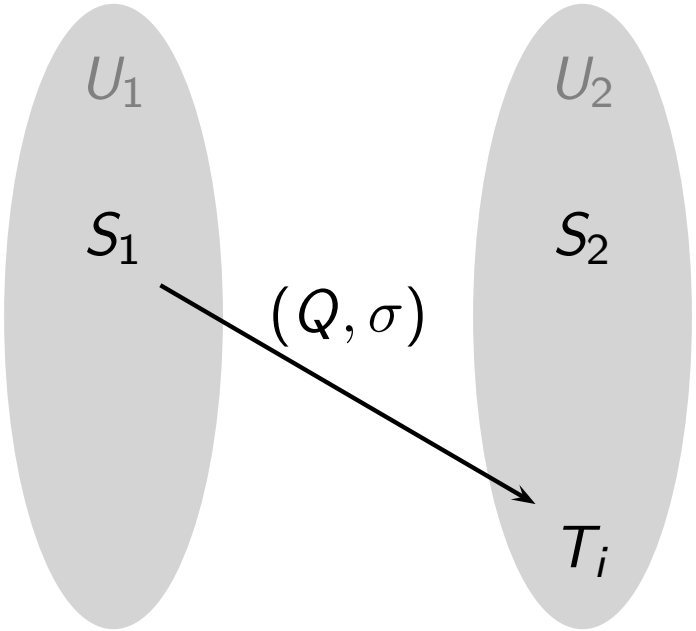
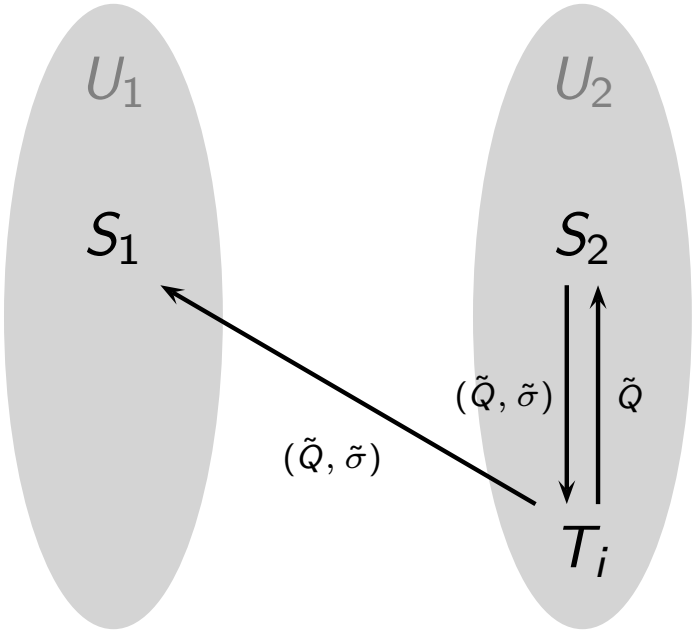
2. When filled-in, the quiz is sent to server S_2 of U_2.
3. S_2 signs it and send it back to T_i with the signature.
4. T_i can verify the signature and send it to S_1 with the signature.

Sending Quiz



Sending Quiz Back



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- Quizzes are signed so that teams are ensured not to have a fake one.
- Servers use batch verification.
- Teams are authenticated to their respective university server when sending the quizzes back.
- Authentication is done using a simple challenge-response protocol.

Threat Model

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- Forge fake quizzes. Hence the signature when sending quizzes.
- Fill in the quizzes of another team. Not possible by construction.
- Modify the answers in a filled-in quiz. Hence the signature when sending back.

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- The homomorphism can be either $\left(\frac{\cdot}{p}\right)$ or $\left(\frac{\cdot}{q}\right)$.

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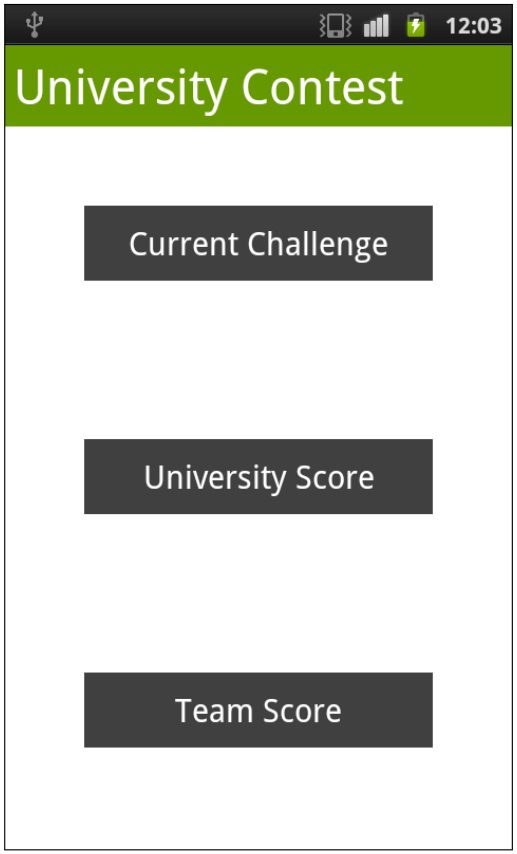
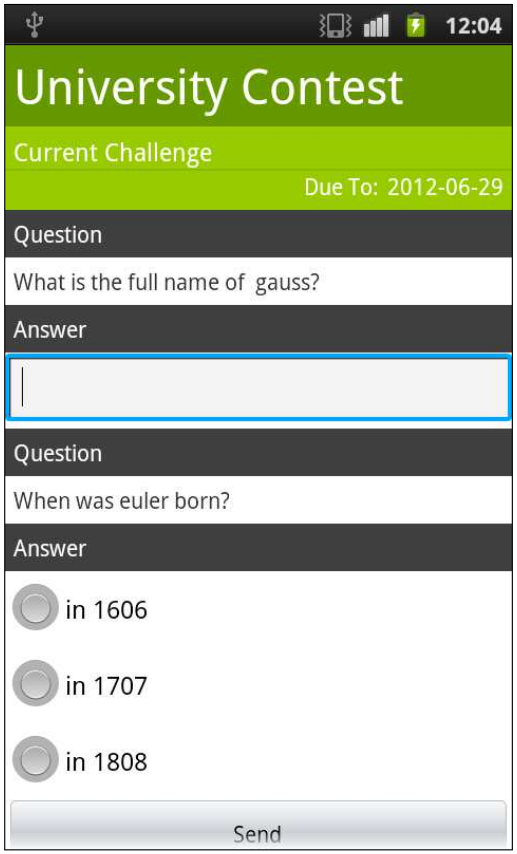
UniversityScoreActivity To get the score of all participating universities.

TeamScoreActivity To get his team score and the results of the quizzes.

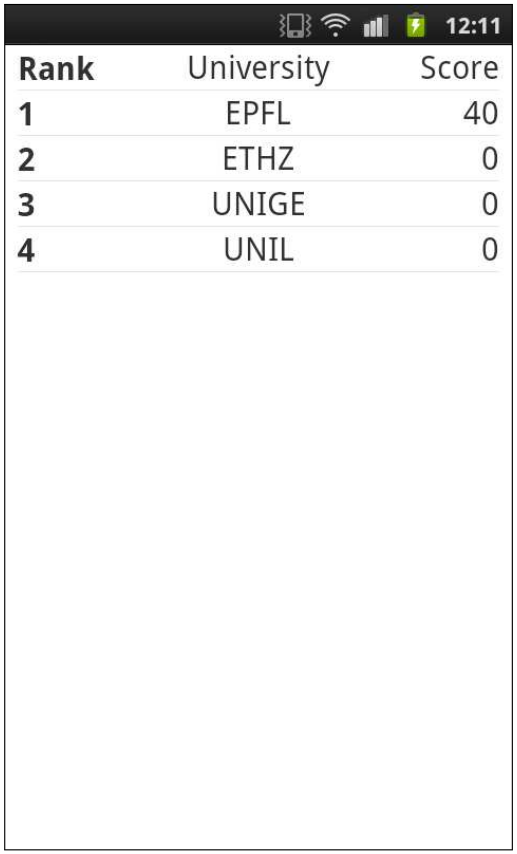
Main Menu


12:03
University Contest
Current Challenge
University Score
Team Score

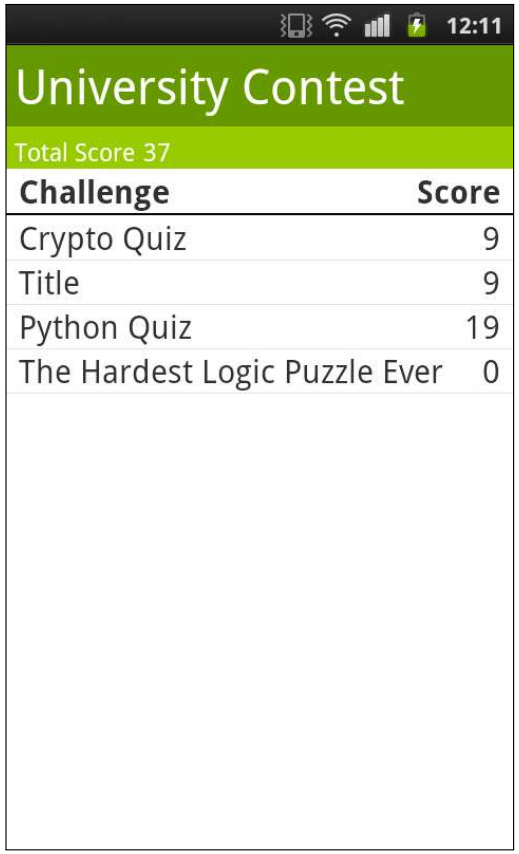
ChallengeActivity

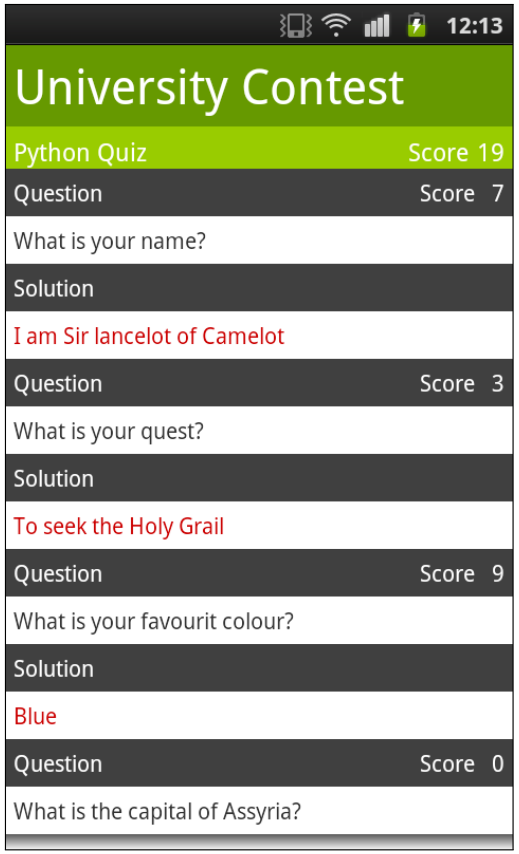


UniversityScoreActivity



TeamScoreActivity





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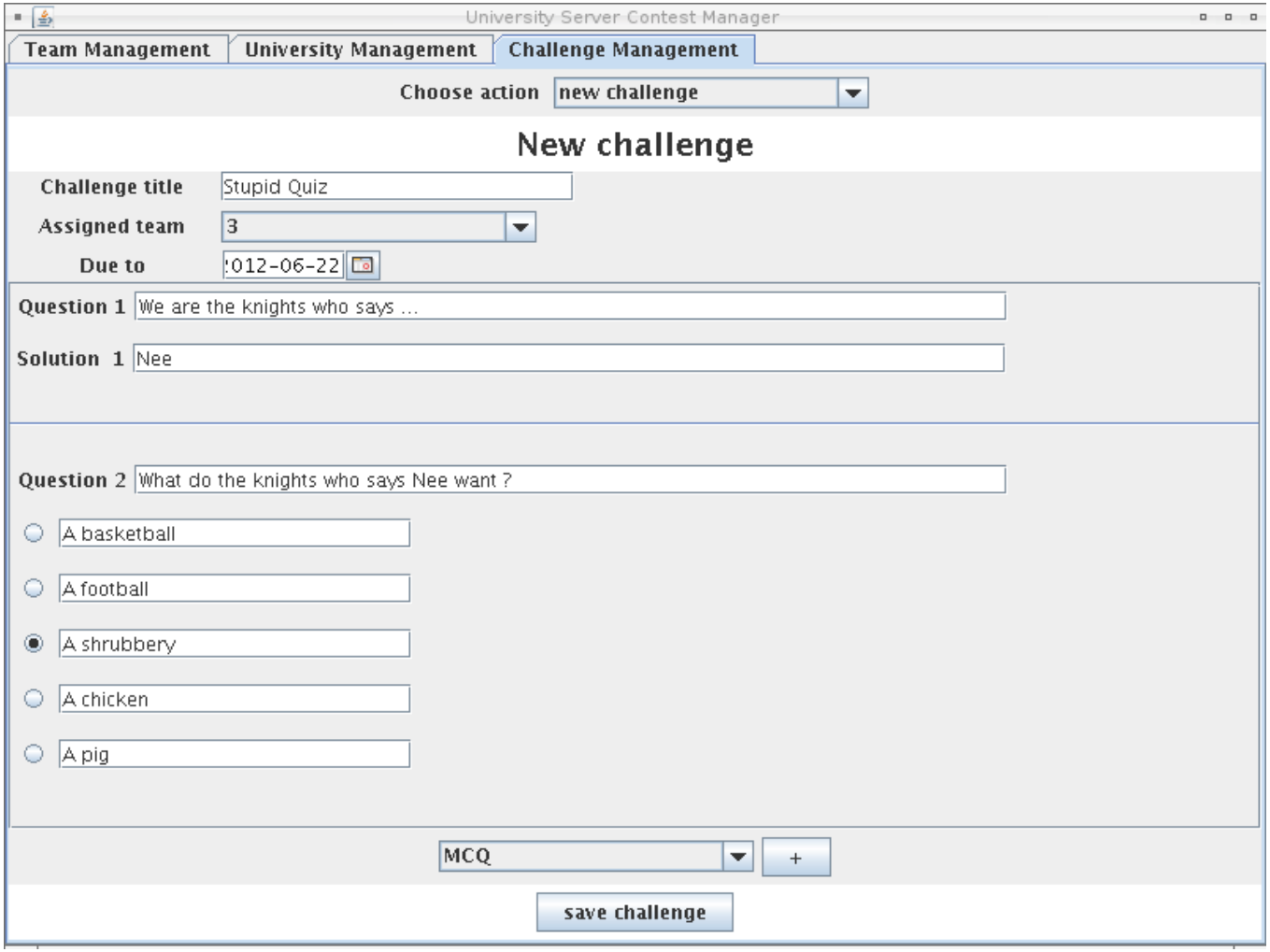
unicontest The database consisting of three tables (team,challenge and university).

Challenge Manager



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Conclusion

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Future Work: Find other applications using MOVA which look a bit less artificial.

Thanks for your attention !