DIGITALSEAL:

A TRANSACTION AUTHENTICATION TOOL FOR ONLINE AND OFFLINE TRANSACTIONS

INHA UNIVERSITY

theVaulters

UNIVERSITY OF CENTRAL FLORIDA

Changhun Jung

Jeonil Kang

Aziz Mohaisen

DaeHun Nyang

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ABSTRACT

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- **Abstract**
  - **Existing various OTPs have a shortcomings against MitM, MitB.**
  - **DigitalSeal can scan a barcode which includes transaction information and then make a HOTP's Tag, The HOTP's Tag can be used to make up the shortcomings.**
  - **DigitalSeal is built by using a Arduino etc and can be used to online and offline transactions.**

INTRODUCTION

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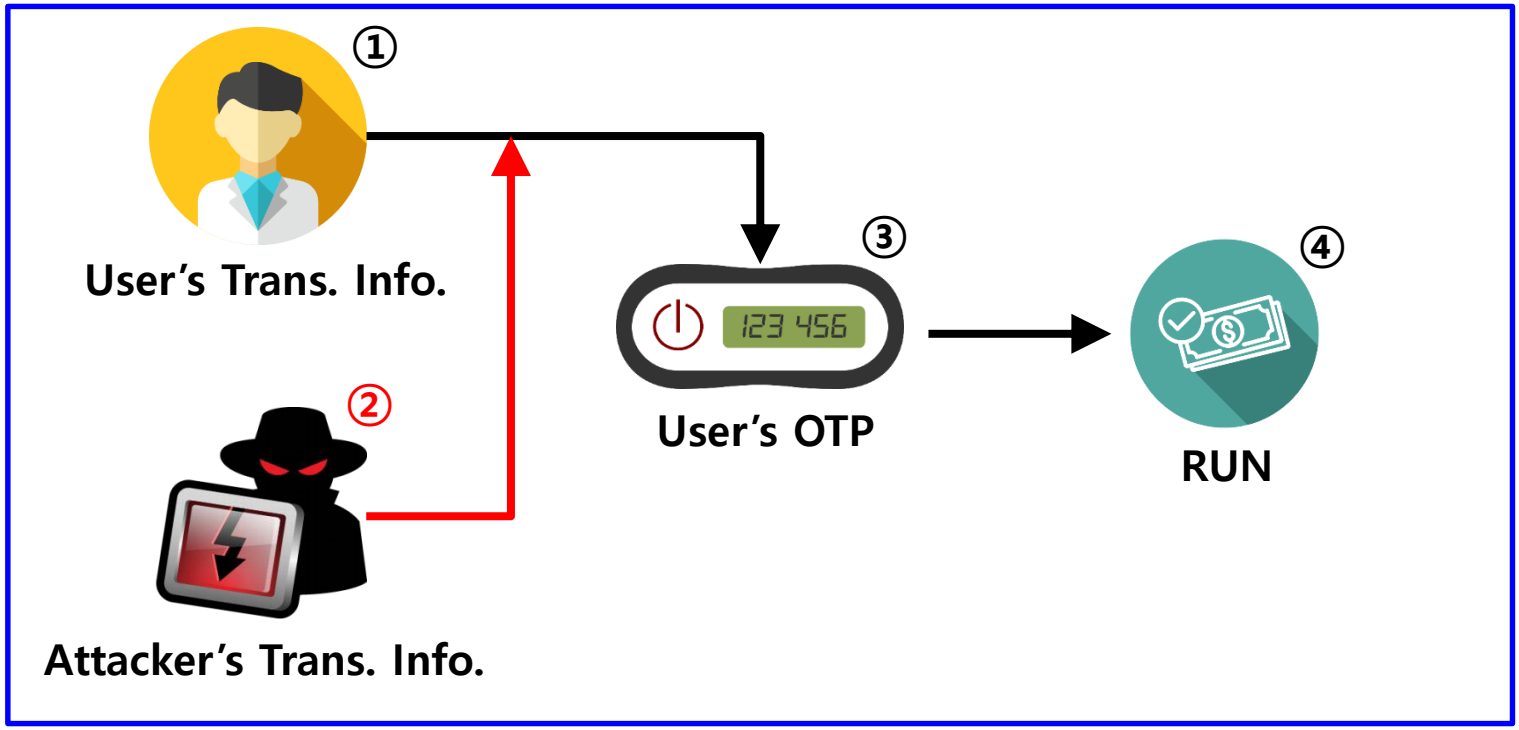
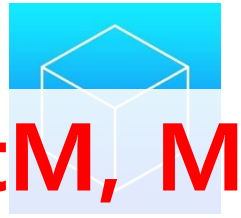
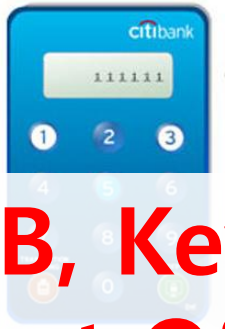
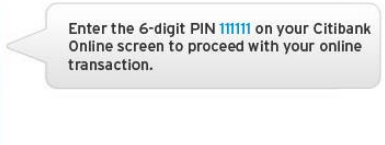
- **Shortcomings of existing OTP**
  - **Existing various OTPs have a shortcomings against MitM, MitB.**



INTRODUCTION

- **Shortcomings of various Authentication Tools**
  - **Google Authenticator, Free OTP, Citibank OTP, RSA's secureID, Dell's defender, Secure Card and Ezio Optical Reader have a various vulnerability.**

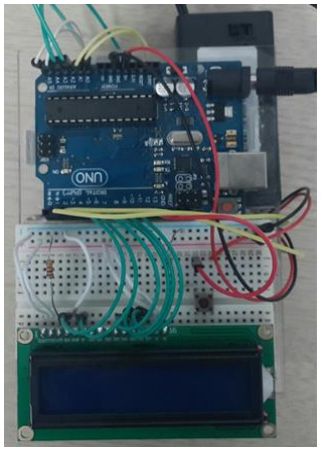




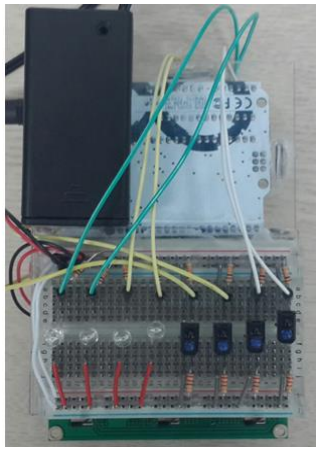


MitM, MitB, Key Management, Not Support Offline Transaction


INTRODUCTION

- **DigitalSeal**
  - **We introduce DigitalSeal, a transaction authentication tool that works in both online and offline scenarios.**
  - **DigitalSeal is capable of reading information viewed on paper, computer monitors, kiosk monitors and smartphone.**





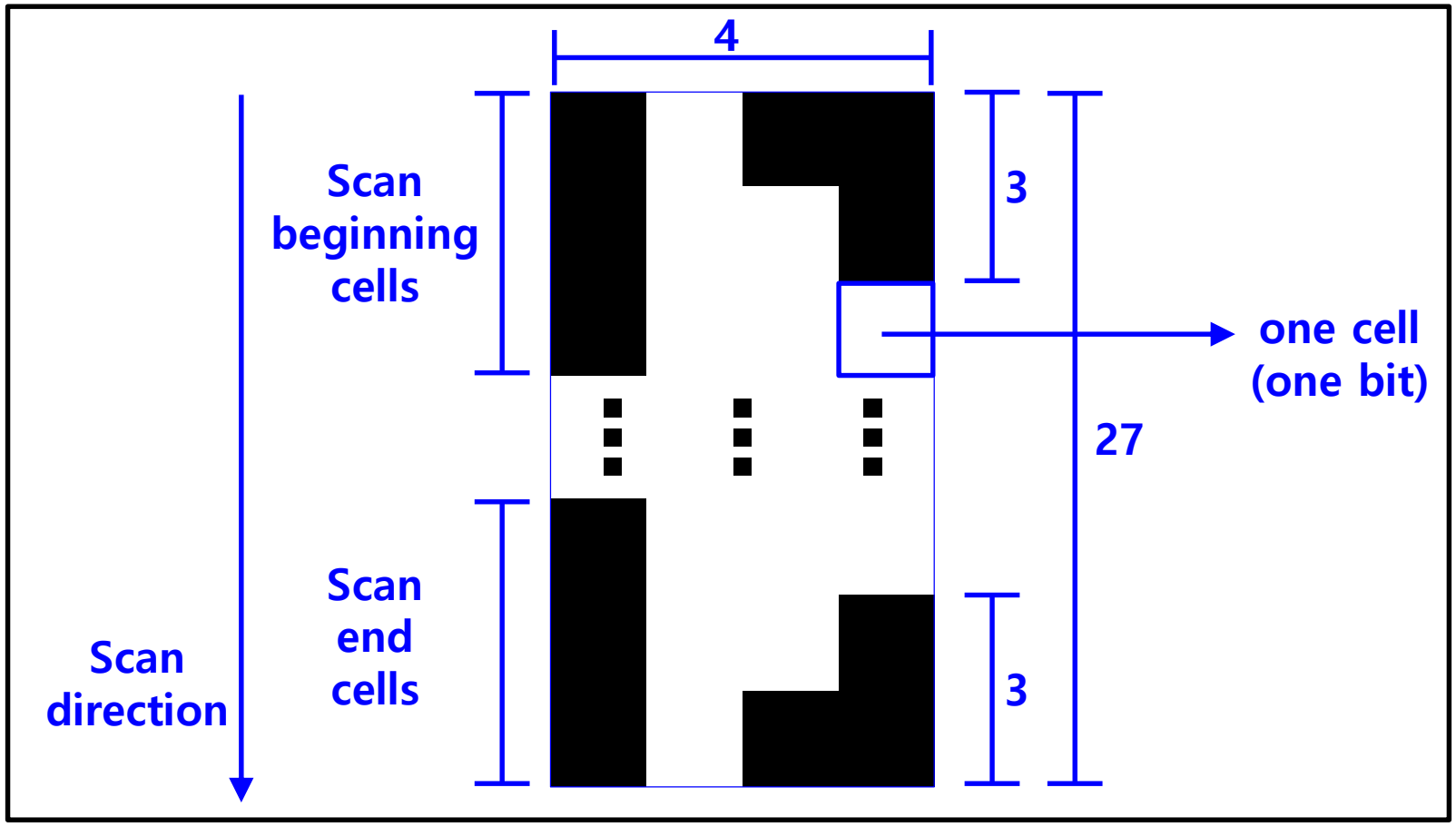
DIGITALSEAL

DIGITALSEAL

- **DigitalSeal**
  - **In DigitalSeal, a user swipes DigitalSeal downward so that it can scan a crafted barcode on a screen or piece of paper.**
  - **The crafted barcode contains the transaction information, such as recipient name, amount of transaction, etc., and DigitalSeal displays a HOTP's tag calculated with a preshared key and transaction data on DigitalSeal's LCD screen.**

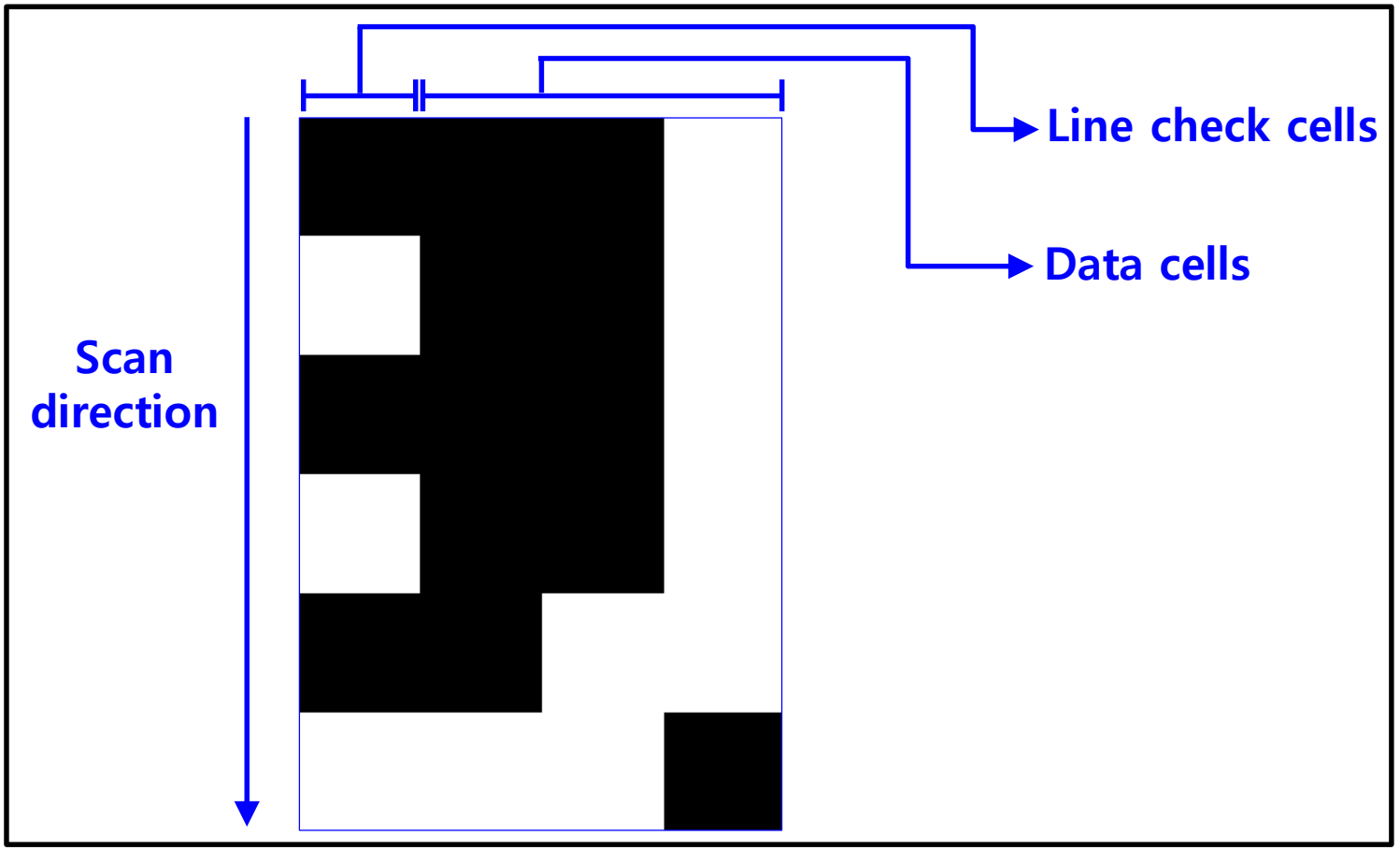
DIGITALSEAL

- The craft barcode for DigitalSeal



DIGITALSEAL

- The craft barcode for DigitalSeal



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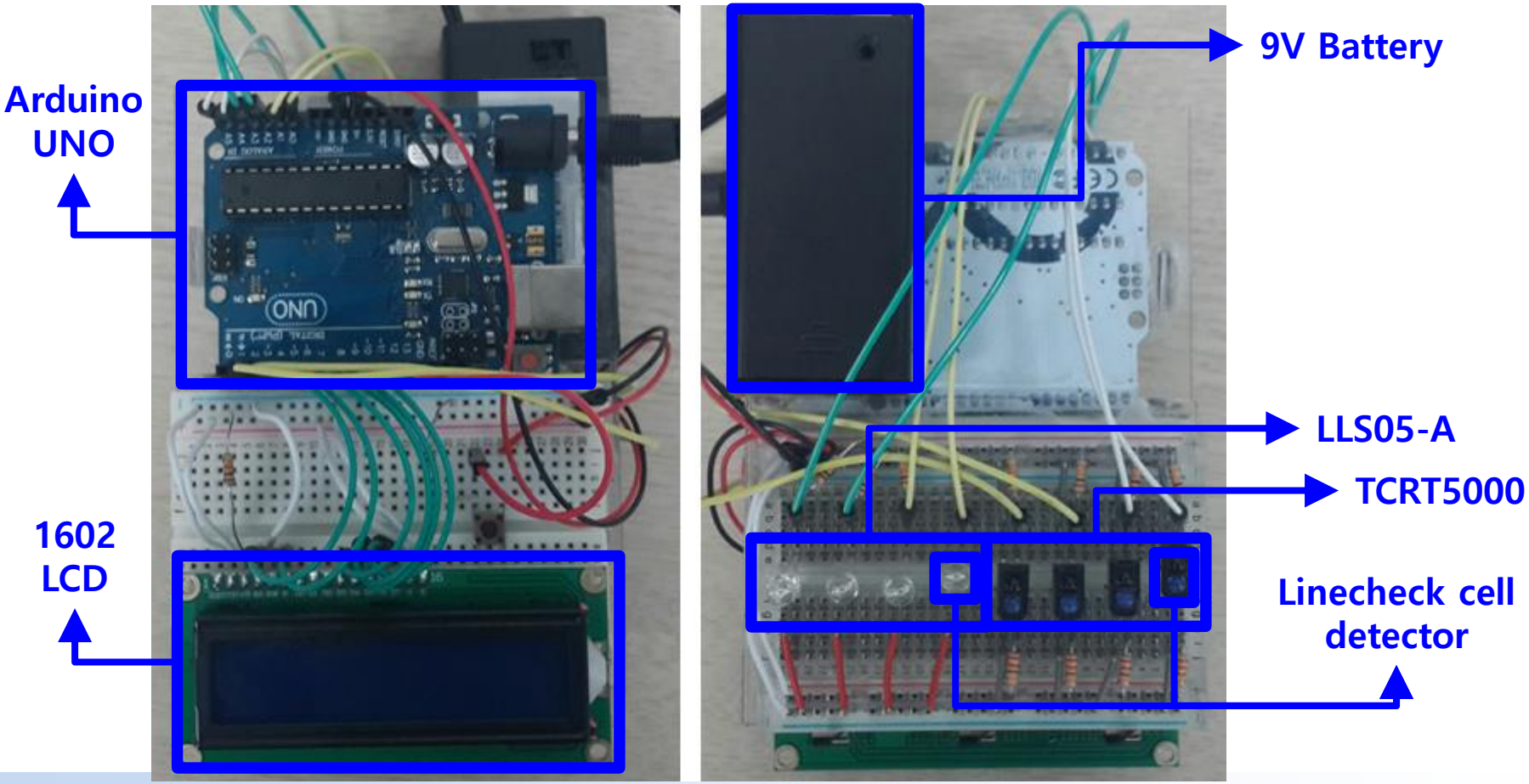
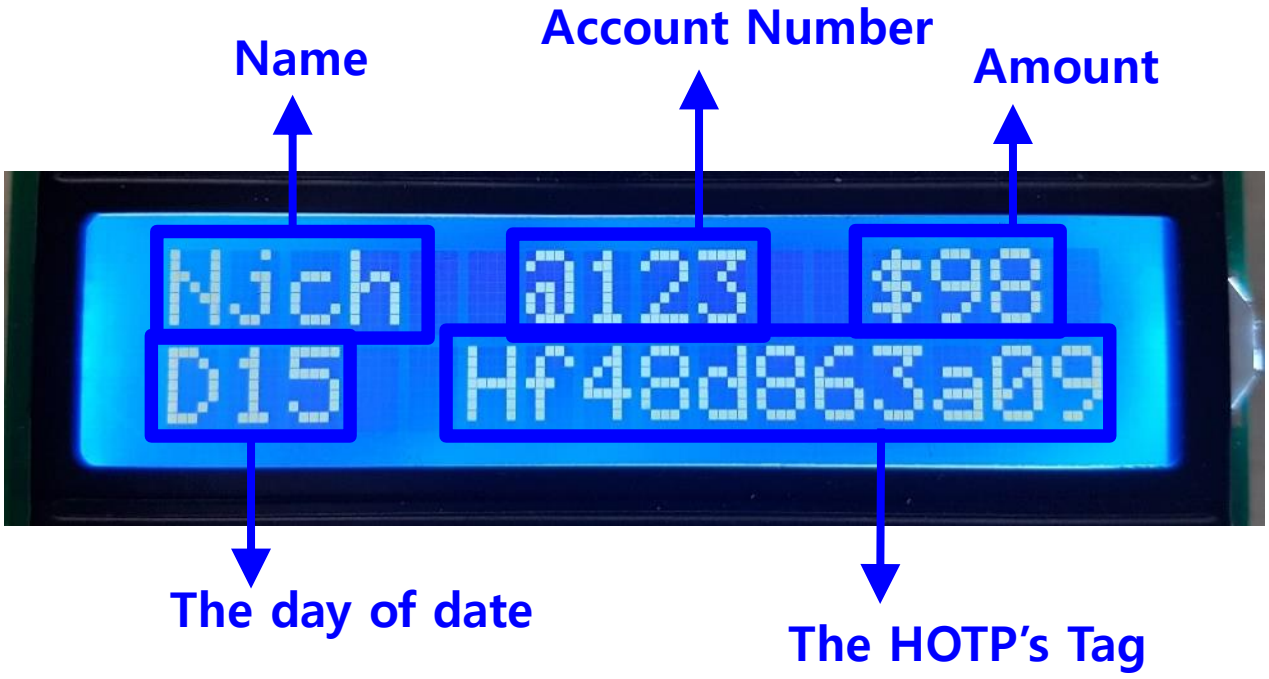
- Components for DigitalSeal



DIGITALSEAL

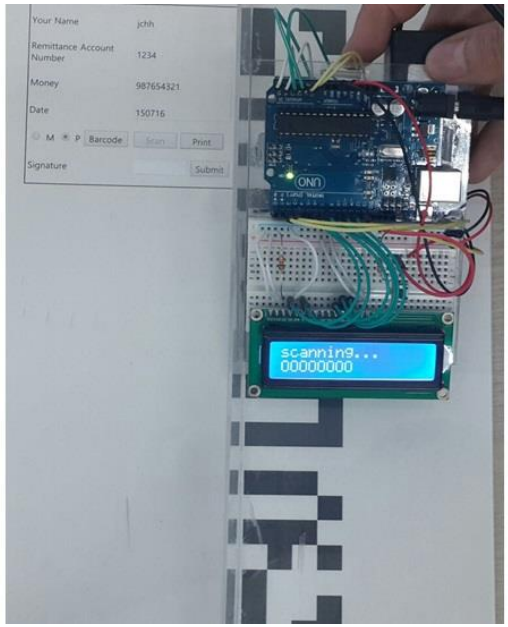
- Output Format on DigitalSeal LCD



DIGITALSEAL

- Using DigitalSeal

on Monitor

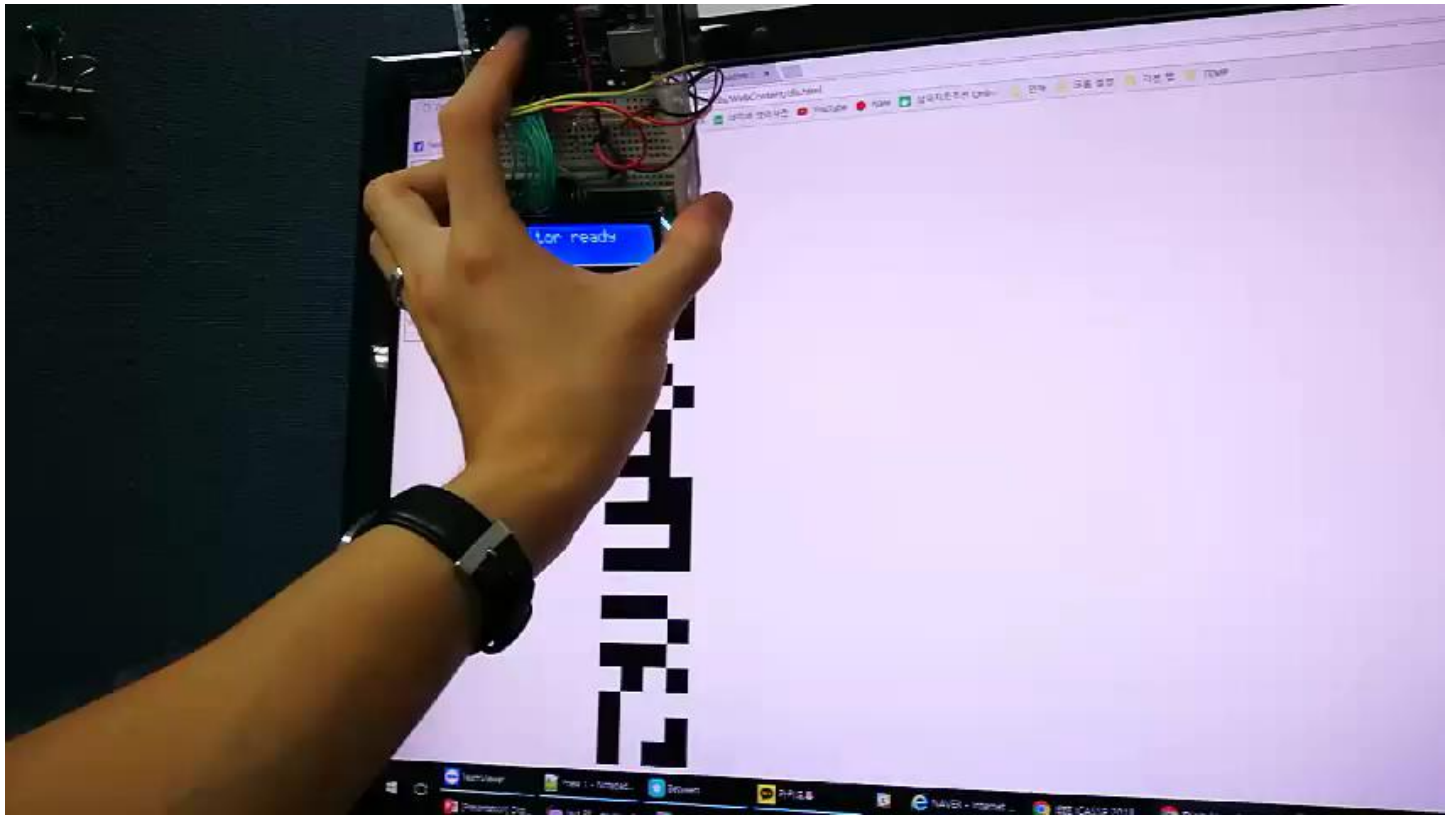


on Paper

on Smartphone

DIGITALSEAL

- Using DigitalSeal



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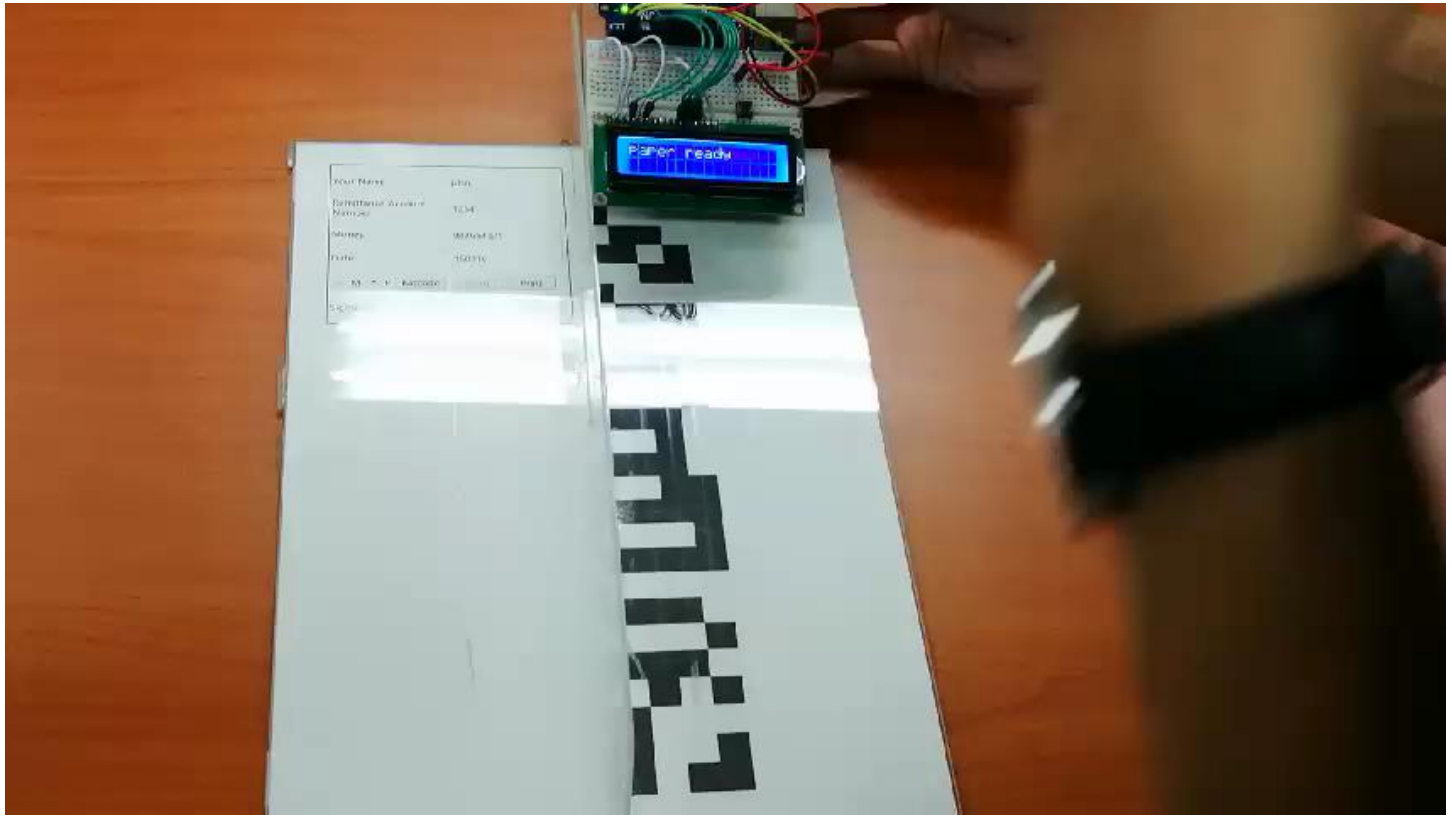
- Using DigitalSeal



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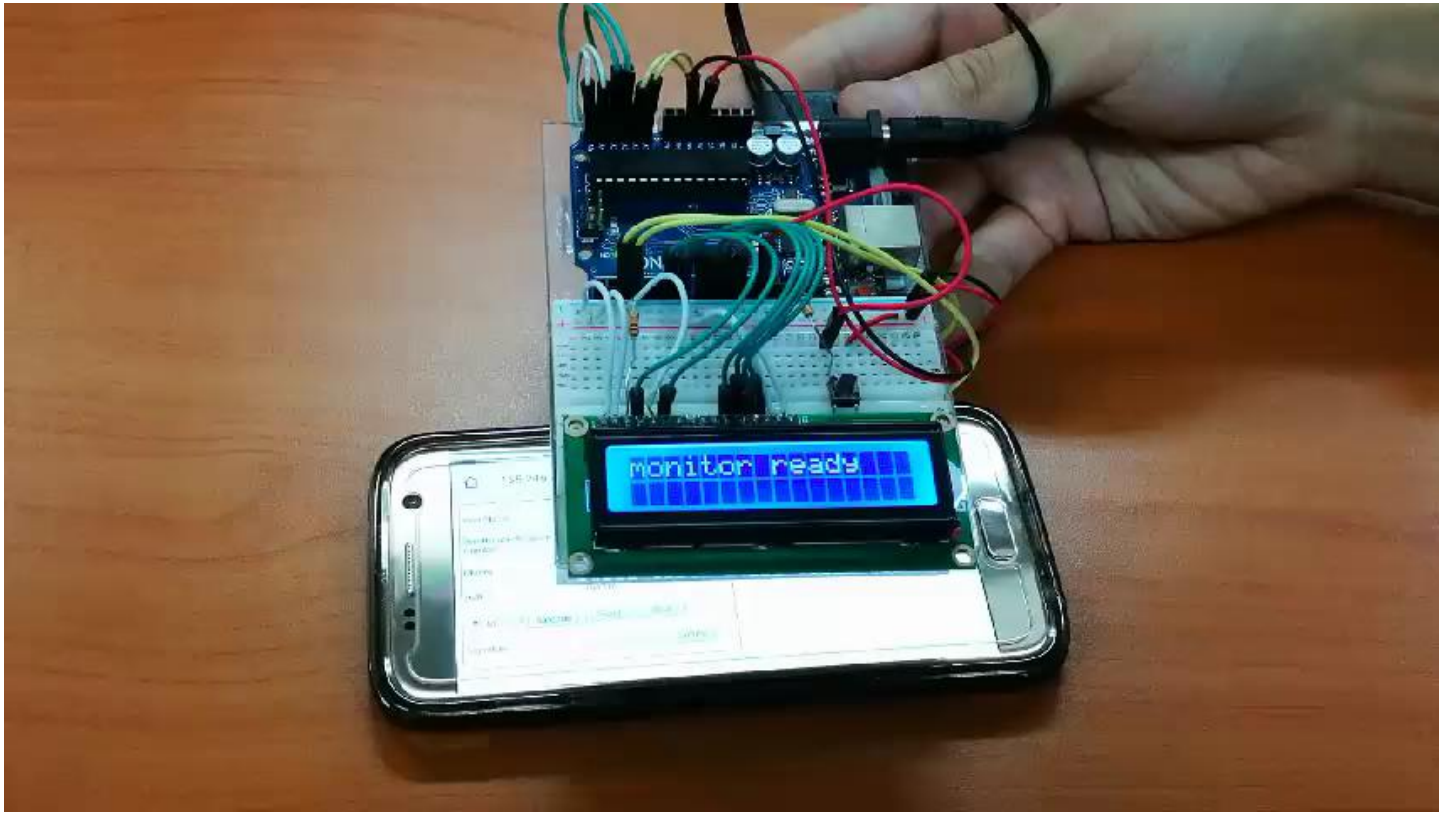

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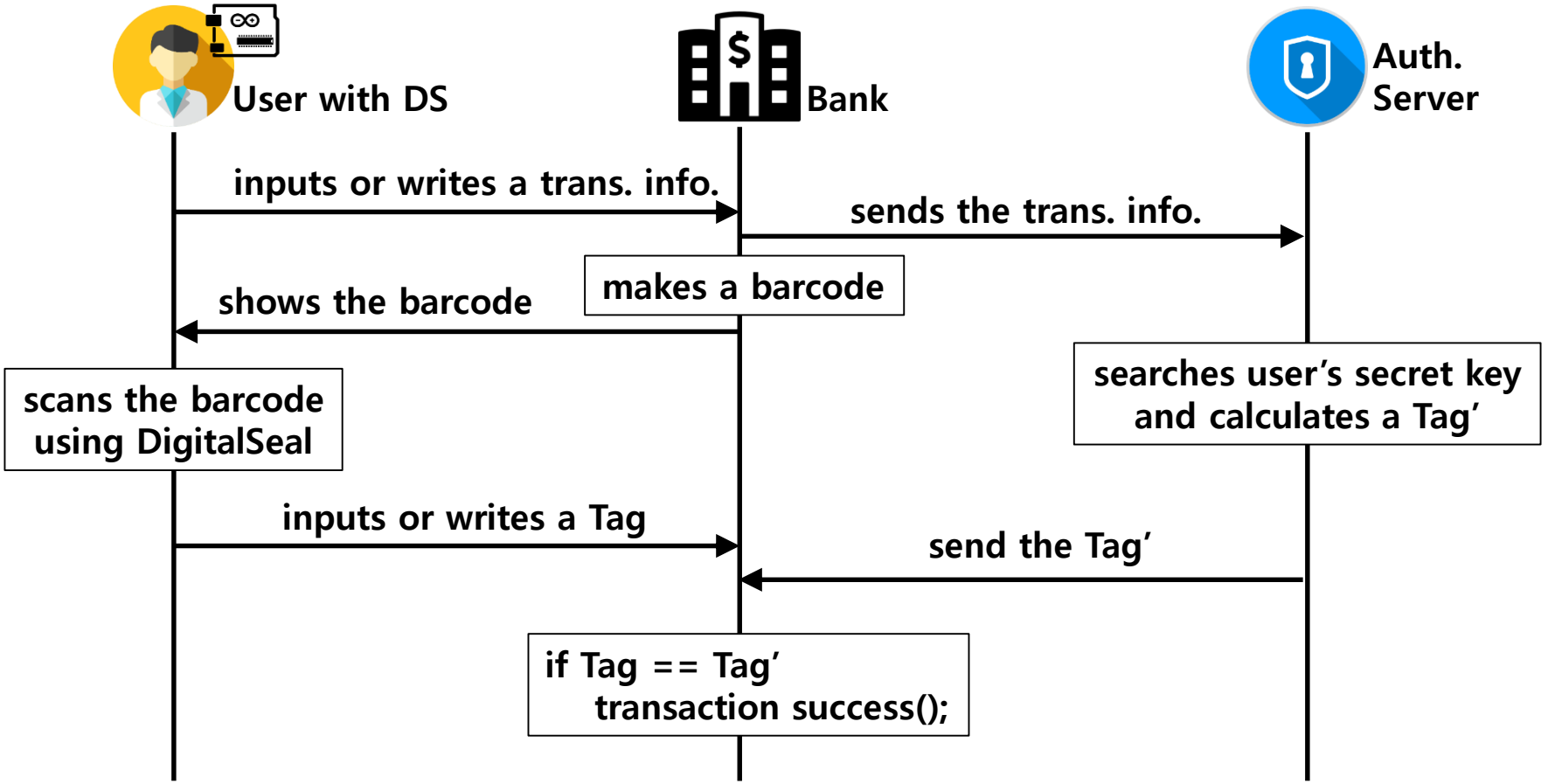

USER STUDY

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- **User Study**

monitor	participants	10
avg	success rates / scanning times	98% / 2.6s
paper	participants	10
avg	success rates / scanning times	94% / 3.2s

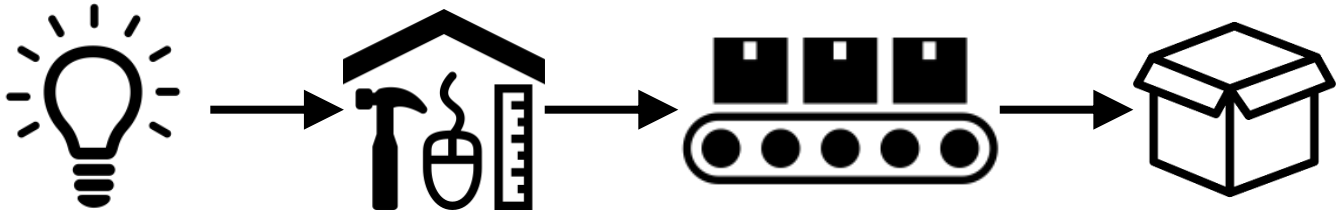
SECURITY AND COST ANALYSIS

SECURITY AND COST ANALYSIS

- **Security Analysis**
  - An attacker does not have a route to penetrate the device.
  - It is also strong against transaction fraud such as MitM and MitB attacks.
  - It is strong against replay attack.
  - It can reduce the forgeability of legal seal or signatures on paper.
  - Therefore, DigitalSeal can make more secure transactions as an authentication based on transaction information, not entity authentication.

SECURITY AND COST ANALYSIS

- **Cost Analysis**
  - **We expect that DigitalSeal can be implemented at a cost of about $1 USD when it is commercialized and manufactured with a mass production system (at scale).**



CONCLUDING REMARKS

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- **CONCLUDING REMARKS**
  - **We introduced DigitalSeal, a transaction authentication tool that works in both online and offline transactions.**
  - **DigitalSeal can scan the barcode included the transaction information on paper, computer monitors and smartphones.**
  - **We confirmed that DigitalSeal is usable and makes up the weak point of previous existing OTP.**
  - **In the future work, we will further explore other usability of DigitalSeal by large scale deployment, and ways to address unforeseen issues.**

Q & A

Thank you