Per-Role Device Management via NFC
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Goal

- **Goal:**
  - Create a simple solution to lock down functionality of work devices for employers that require role-specific software, such as auto dealerships
  - Be able to reallocate devices to different work roles
- **Solution:**
  - Build an android native app that displays certain utility screens based on a physical accessory affixed to the device
  - App contains built-in activities for each work role and limits access only to activity authorized by presence of the accessory

Motivations and Objectives

- **Motivations**
  - Existing mobile device management solutions rely on user provisioning to limit user access which is inefficient and complex
    - Without MDM, devices must be task specific to restrict user access. Therefore, more devices would need to be on hand.
- **Objectives**
  - Control user access without user provisioning, avoiding passwords, user types, and privilege levels
    - Assign any device to any task as needed, potentially reducing the amount of devices needed on hand

Research Challenges

- Leverage NFC Android API to launch an activity based on contents of read tag
- Choice of 3D printing material for durability, flexibility, and cost efficiency
- 3D modeling a form fitting accessory and housing an NFC tag in it

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Software

- Encode NFC tag with Activity specific string
- Read NFC tag string and call an Intent to launch the appropriate Activity
- Include financial calculator, inventory list, and service schedule Activities
- Use Android Studio for development, DesignSpark Mechanical and Cura for 3D modeling and printing

Hardware

- Measure device and 3D model to fit and evolve prototype based on fit and finish
- Test a variety of filament types (PLA, ABS, PETG) for strength, flexibility, and finish
- Print in several colors to be easily distinguishable

Methodology

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Results

- Android application reads NFC tag and launches appropriate Activity depending on its contents
- PETG used for the working model due to its flexibility and strength, PLA for color models due to its fast print time and cheap price

Discussion

- Using this system, the device is restricted to one authorized activity and can be re-allocated to a different role just by exchanging the accessory
- Physical access to the accessory is easily regulated by a manager and appropriate use is quickly verified, distinguishing accessories by color

References

- https://www.rs-online.com/designspark/mechanical-software