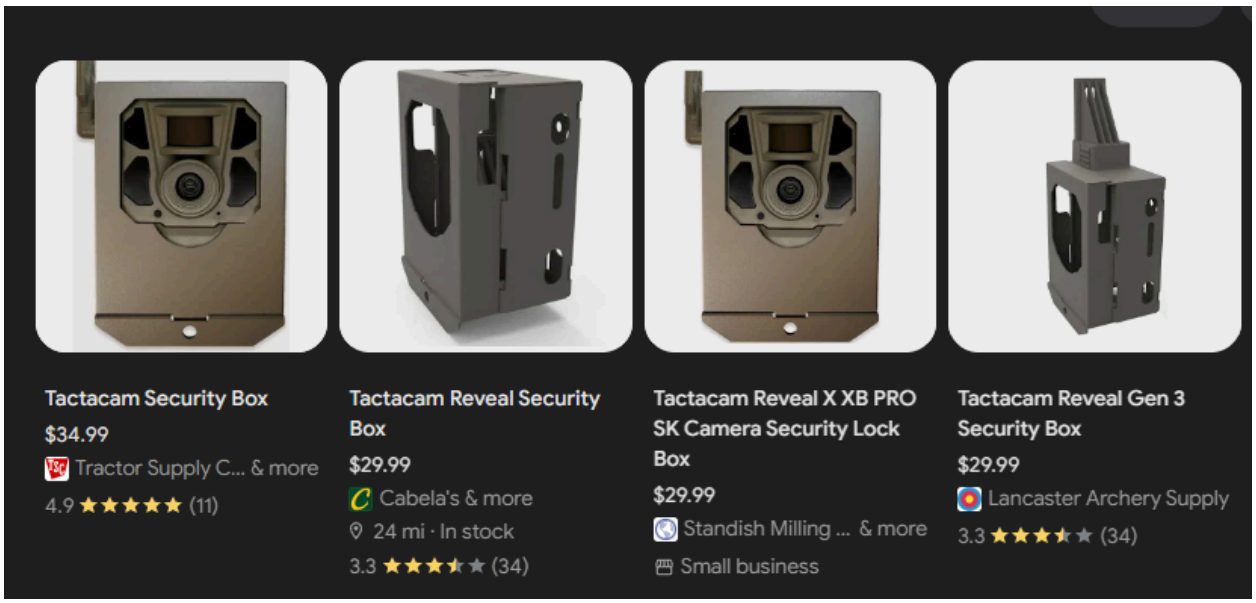
CPE495
G10: Bobby & Tate

Research of Necessary Security Components

- Notes:
  - Outside of security components that we can use to protect the device, people steal trail cameras all the time.
  - Three methods that current trail camera users use for thief-proofing their cameras:
    - They utilize cameras with black flash as black flash cameras do not have visible flashes.
      - Other versions include white flash or infrared but these flashes are visible.
    - They put them out of reach (around 10ft up the tree to stay out of eye-level)
    - The final method in one article I looked into was a lock box. It will add weight but it makes the trail camera much more difficult to steal
  - These three methods can be added into development if needed in the Spring Semester for future additions.
  - Some examples:



- Tamper-Proof Mobile Application
    - STRIDE Model will need to be created
        - May use OWASP Threat Dragon to assist with this
            - Was suggested by our mentor, Dr. Coe
        - Must be able to defend against at least two attacks
    - May look into anti-reverse engineering methods
        - Obfuscation of code
        - Runtime Integrity Checks
        - Keep sensitive data encrypted or ensure its not stored where anyone can view it.
    - Have some form of user authentication
        - Most likely would need to use multi-factor authentication
        - Password or some special code, maybe a one-time code
- Radio communication security
    - Encryption of data transmission
        - Possible use of end-to-end protocols like AES-256
        - May use LoraWAN or Zigbee protocols that have built-in security features
    - FHSS or Frequency Hopping Spread Spectrum may be possible
        - Using frequency hopping would make an attack more difficult to jam
        - May make intercepting communication more difficult as the frequency will not always be the same
    - Mutual Authentication between nodes
        - Set up an authentication process between the mother and edge node prior to sending data
        - Could try something like RSA for this
    - Digital Signatures
        - May utilize digital signatures in messages for users to verify integrity of the data in the message.
    - On device/database encryption
- Physical Security
    - Lockboxes
        - As stated in the top section, lockboxes are a common form of physical security
        - May be made out of steel
        - You place the trail camera inside and the lockbox houses it.
            - Usually has some form of lock like a padlock to make it an inconvenience for most robbers to go for. Would have to be serious to take it off.
        - May use some form of camouflage
        - May utilize bolts, straps, or locking cables for secure mounting
            - Makes it harder for robbers to steal the trail camera
    - Cable locks
    - Decoy Cameras

    - May include GPS or tracker in case camera is stolen
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