Problem solutions 6

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1 Solutions

Exercise 1:

"Jason R. C. Nurse, T., 2020. Strava Storm: Why Everyone Should Check Their Smart Gear Security Settings Before Going For A Jog. [online] Scientific American. Accessed 9 December 2021.":

1. An inversion attack was performed. The company released a public heath-map to show people common paths that the users were doing around the world, and researchers analyzed the data trying to match possible locations of military basis.

2. Sensor data layer, by the fact that the data from many users was exposed, and created an easy base for the attackers.

3. Enabling the user to opt-out from the data collection, and reduce the range of visibility of other routes to a nearby radius. For military, it should be enforced that no third-party apps are used as fitness monitors.

Goodin, D., 2020. When Coffee Makers Are Demanding A Ransom, You Know Iot Is Screwed. [online] Ars Technica. Accessed 9 December 2021. Link here

1. The original firmware was replaced with a custom one, injected as it was a OTA update.

2. The target was the firmware level, with goal to change the behavior of the machine, and turn the coffee machine to a cryptocurrencies miner.

3. Using code signing (when updating a firmware), encryption (HTTPS) and authentication (when accessing the machine's Wi-Fi). These may require a more powerful CU than the ESP8266.

Exercise 2:

1. We concatenate identity and occupation and perform the sha256 hashing over the string. The result of "Bruce Wayne" + " " + "Businessman" is dd36c7c2458f2b6dfd06950561df777f39f8c5b7a6f5c5814cabbba5d5e2960a.

2. We perform k-anonymity over the weights and the height of each identity. First sort the array (see notebook), take the interval of three numbers (3-anonymity) so that here only three persons can be identified.

Table 1: 3-anonymity

Weight	Height
56-66	170-178
75-80	178-180
88-96	182
100-107	185-187
107-147	187-191

Table 2: 2-anonymity

Weight	Height
56-57	170-177
66-75	177-180
76-80	182
88-91	185
95-100	187-191
102-107	
135-147	

In 3-anonymity, picking the height 182, we can identify Flash, Green Lantern, and Wonder Woman.
In 2-anonymity, picking a weight between 95 and 100 can be Batman or Captain America.

Exercise 3:

We found the respective averages $avg_{total} = 91,14285714$ and $avg_{no-Bruce} = 90,84615385$. We invert the formula, and do

$$b_{total} = \sqrt{\frac{1}{2avg_{total}}(-|x|)} = 2.6457513111060598$$

. Removing B. Wayne from the list and comparing with the respective average, we get:

$$b_{no-Bruce} = \sqrt{\frac{1}{2avg_{no-Bruce}}(-|x|)} = 2.6500682974358214$$

. Therefore $\epsilon_{total} = 0,378, \epsilon_{no-Bruce} = 0,377$, which doesn't tell if Bruce was considered in the calculation or not.