Name: Jianan Luo
Student #: 20523403
UW UserId: j43luo

1.

a)
Something the user knows: PIN, password, unlock pattern
Something the user is: fingerprint, application
Something about the user's context: Wearable device

b)
PIN:brute-force guessing
Unlock pattern: shoulder surfing
Wearable device: might get stolen

c)
Known P:
P(unlock | stranger) = 0.05
P(lock | alice) = 0.08
P(stranger) = 0.1
Other P can be calculate:
P(lock | stranger) = 1 - P(unlock | stranger) = 1 - 0.05 = 0.95
P(alice) = 1 - P(stranger) = 1 - 0.1 = 0.9
Therefore:
P(lock) = P(lock | stranger) * P(stranger) + P(lock | alice) * P(alice)
= 0.95 * 0.1 + 0.08 * 0.9
= 0.095 + 0.072
= 0.167
Bayes' Theorem:
P(stranger | lock) = (P(lock | stranger) * P(stranger)) / P(lock)
= 0.95 * 0.1 / 0.167
= 0.568862275 = 56.9%

Reduce the false rejection rate:
As long as the observed trait is sufficiently close to previously stored trait, let the machine accept it.

2.

a)

D001: (Condential, {Alpha, Gamma})	Neither
D002: (Top Secret, {Alpha, Gamma, Delta})	Write
D003: (Secret, {Alpha, Delta})	Both
D004: (Secret, {Beta, Gamma, Delta})	Neither
D005: (Condential, {Delta})	Read

b)

i. D101	->	(Secret, {Alpha, Delta})
ii. Alice	->	(Confidential, {Alpha})
iii. D103	->	(Confidential, {Delta})
iv. D104	->	(Confidential, {Beta, Delta})
v. Carol	->	(Confidential, {})

3.

a)

1. Packets that does not have a specific source address and are originally from uWaterloo
2. Traffic that has a specific source address and are originally does not from uWaterloo

b)

1. Packet filtering firewall is able to defend external attackers
2. Network-based IDS can prevent the devices in the lab from attack by monitoring all devices and identify any suspicious actions.
3. Network-based IDS can store the information about remote logins that are from external networks

c)

No. Access from the work computers to the experiment will not go through the firewall, since the firewall is between the internet and the router, and access from the work computers to the experiments will through the router only, no internet needed. Therefore No.

DIRECTION	PROTOCOL	SOURCE	PORT	DESTINATION	PORT
OUT	TCP	172.16.101.0/24	22	172.16.100.254	22
IN	TCP	172.16.100.254	22	172.16.101.0/24	22