

# Accounting

## Introduction to IT Security

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## AAA

- Authentication: who you are
- Authorisation: what you can do
- **Accounting: tracking what you have done**

# Two parts to accounting

- 1 Logging events
- 2 Reviewing logs

# Logging events

An application of any importance should write logs.

- Log any problems or exceptions that could indicate a bug.
- Log events that could represent a security issue like a failed login.
- You may want to log apparent user errors.
- You may want to log routine events if your application has security-sensitive function.
- Be wary of over-logging. You will train users to ignore your logs if they contain useless information.

# How to log

- Usually we write to a log file.
  - This is simple to do.
  - Operating systems already include this capability. (e.g., Windows Event Log, Unix/Linux syslog)
  - It's easy to set up other programs to monitor and process logs.
- Occasionally, an application may log events in a database in order to support more complex built in event reporting.

# Remote logging

For large or security-intensive applications, consider logging to a remote server.

- Logs are preserved even if the system running the application is compromised.
- It's easier to check and manage centralised logs.

# Log levels

- Logging services usually support a number of logging levels, e.g. informational, warning, error.
- Application configuration should include selection of log level.
- This helps avoid over-logging.

# Monitoring logs

- We can, and do, view logs manually.
- If we have a large volume of logs, we may use software to process and summarise the logged data.
- We may use monitoring programs to check logs in near real time to alert us to problems.
- Separating responsibility for writing logs from the responsibility for monitoring logs
  - means that application programmers don't have to anticipate user security demands;
  - gives users the flexibility to design and implement their own log monitoring protocol.



# Log handling and retention

Now that we are producing and reviewing lots of logs, we need a plan for retention.

- This is a policy decision balancing security needs with storage and handling capacity.
- In some areas there may be legal or regulatory concerns.
- Consider storing logs on secured write-only media.

# Today's lab

We will take the password checking program we wrote last week and add logging to it.