



F11.5 Passwords and authentication

Cyber security · GCSE · OCR J277 1.4.2, AQA 8525 3.6.3, Edexcel 1CP2
6.4.4 · about 15 min

Name _____

Class _____

Date _____

What this lesson is about

Ways to authenticate, strong passwords, 2FA, CAPTCHA and hashing.

- Ways to prove who you are
- Storing passwords safely
- What makes a password strong?
- Locking the robot

Questions

5 marks in all

- Which makes a password stronger? [1 mark]
 - ☐ A Making it longer and more varied
 - ☐ B Using a real word
 - ☐ C Using your birthday
 - ☐ D Reusing it everywhere
- What is two-factor authentication? [1 mark]
 - ☐ A Using two different kinds of proof, such as a password and a phone code
 - ☐ B Two passwords
 - ☐ C A longer password
 - ☐ D Logging in twice
- What is a CAPTCHA for? [1 mark]
 - ☐ A Proving you are a human, not an automated program
 - ☐ B Encrypting your password
 - ☐ C Storing your password safely
 - ☐ D Speeding up login
- Why should passwords be stored as a hash, not plain text? [1 mark]
 - ☐ A If the file leaks, the real passwords are not exposed
 - ☐ B It makes login faster
 - ☐ C Hashes are shorter
 - ☐ D It is required by law
- Why do systems lock you out after a few wrong tries? [1 mark]
 - ☐ A To defeat brute force guessing
 - ☐ B To save electricity
 - ☐ C To back up your data
 - ☐ D To speed up the server

The task: a password checker

Write `strength(password)` scoring one point for each rule met: at least 8 characters; a lower-case letter; an upper-case letter; a digit; a symbol (a character that is not a letter or digit). For each password in `passwords`, print `<password>: <score>/5 <verdict>`, where the verdict is `weak` for 0 to 2, `ok` for 3, and `strong` for 4 or 5. At the end print `strong passwords: <n>`.

```
# the two lines every program starts with: the commands, then the robot
from bugbot import *
connect()

passwords = ["robot", "Sunshine", "Bugbot42", "x9$Lq2!vT", "12345678"]
```

Plan your program here, then type it in and press Run.



Do it on the robot

www.bugbotlab.com/learn/f11-5-passwords-and-authentication/

The simulator checks it and tells you when it passes. Nothing to install, no account.

Challenges

1. Add a rule that a password must not contain the word "robot" or "password".
2. How many guesses is a 6-character lower-case password? Use `26 ** 6`.
3. Why does two-factor authentication protect you even if your password leaks?