

Years 7–8

*I can implement programs in a language like Python or JavaScript.
I can use functions to organise my code.*

General purpose programming languages include Python and JavaScript, as well as others like C++, C#, Java, Perl and Swift.

This pseudocode is part of a simple login and shown in Python and JavaScript.

pseudocode

```

success ← false
WHILE NOT success DO
    username ← INPUT('Enter your username:')
    password ← INPUT('Enter your password:')
    IF username = storedUsername AND password = storedPassword THEN
        success ← true
    ELSE
        DISPLAY 'Invalid credentials. Try again.'
    ENDIF
ENDWHILE
DISPLAY 'Login successful.'
    
```

Python

```

stored_user = 'ari4382'
stored_pwd = 'r34%3!ab'
success = False
while not success:
    user = input('Enter your username:')
    pwd = input('Enter your password:')
    if username == storedUser and pwd == storedPwd:
        success = True
    else:
        print('Invalid credentials. Try again.')
print('Login successful.')
    
```

JavaScript

```

storedUser = 'ari4382'
storedPwd = 'r34%3!ab'
let success = false;
while (!success) {
    let user = prompt('Enter your username:');
    let pwd = prompt('Enter your password:');
    if (user == storedUser && pwd == storedPwd) {
        success = true;
    } else {
        console.log('Invalid credentials. Try again!');
    }
}
console.log('Login successful!');
    
```

Functions are lines of code that have been separated out as a group, so that they can be used and reused whenever needed.

For example, in the login program, you could use a function called **login** to handle the credentials checking. Then, this function can be called upon whenever a user needs to log into the system. Define the **login** function that takes the username and password as **parameters** and returns a login status. The program could also include multifactor authorisation using a function.

Debugging

Is your program behaving unexpectedly? Try these strategies for finding bugs:

- **pair coding** – two coders can be better than one
- **print values** – insert a temporary 'print' line in your code to output a value at the right time
- **step through code** – use your coding software to pause line-by-line as it runs your code



Achievement standard

Design and trace algorithms and implement them in a general-purpose programming language.

Content descriptions

Implement, modify and debug programs involving control structures and functions in a general purpose programming language | Digital Technologies AC9TDI8P09

Years 9–10

My programs are capable of structuring data and functionality in more organised and complex ways.

Modular programs have code across different sections or files. This allows:

- more flexibility
- stronger organisation
- easier collaboration with other programmers.

Data structures store related variables together in the most suitable ways.

For instance, a program can utilise a list or array to store a set of numbers or words. Once data is stored in structures like these, sorting algorithms can be written to place them in numerical or alphabetical order.



[130, 129, 160, 149, 165, 130, 129, 160, 149, 165, 171]



Main program

Main menu display



Specific functions or data

Employee data, add, update, delete



Extra functions

Generate Employee Report

Or it can utilise a record or object to store data, for example, all an employee's attributes – such as name, date of birth, salary and role.



A record or object stores this data.

Employee("Roberts", "Angie", 1995, 5, 4, 86000.00, "manager", false)

Object oriented programming languages (OOP) allow programs to be structured in a particular way, where data is stored together with the actions to be performed on it. Programming languages like Python and JavaScript already include this capability.

In OOP, an "EndangeredSpecies" class can have attributes like name and population, and methods like "increasePopulation" and "decreasePopulation" to manage and track the species' status.



Numbat, endangered species

Achievement standard

Design and validate algorithms and implement them, including in an object-oriented programming language.

Content descriptions

Implement, modify and debug modular programs, applying selected algorithms and data structures, including in an object oriented programming language | Digital Technologies AC9TDI10P09