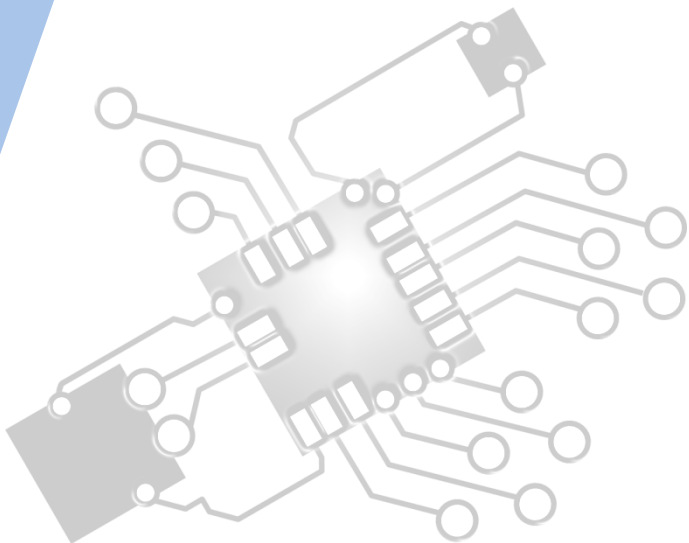




Objects as a programming concept

IB Computer Science



*Content developed by
Dartford Grammar School
Computer Science Department*



HL Topics 1-7, D1-4



1: System design



2: Computer Organisation



3: Networks



4: Computational thinking



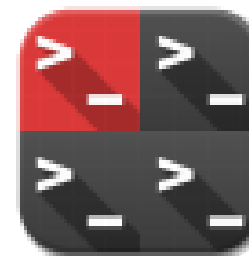
5: Abstract data structures



6: Resource management



7: Control



D: OOP

HL & SL D.2 Overview

D.2 Features of OOP

- D.2.1 Define the term encapsulation
- D.2.2 Define the term inheritance
- D.2.3 Define the term polymorphism
- D.2.4 Explain the advantages of encapsulation
- D.2.5 Explain the advantages of inheritance
- D.2.6 Explain the advantages of polymorphism
- D.2.7 Describe the advantages of libraries of objects
- D.2.8 Describe the disadvantages of OOP
- D.2.9 Discuss the use of programming teams
- D.2.10 Explain the advantages of modularity in program development



1: System design

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5: Abstract data structures

6: Resource management

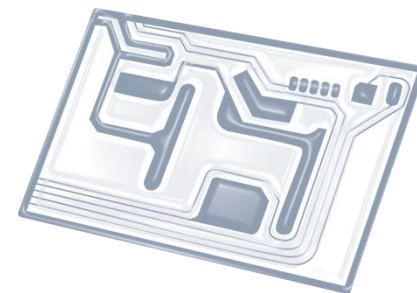


7: Control

D: OOP



Topic D.2.4

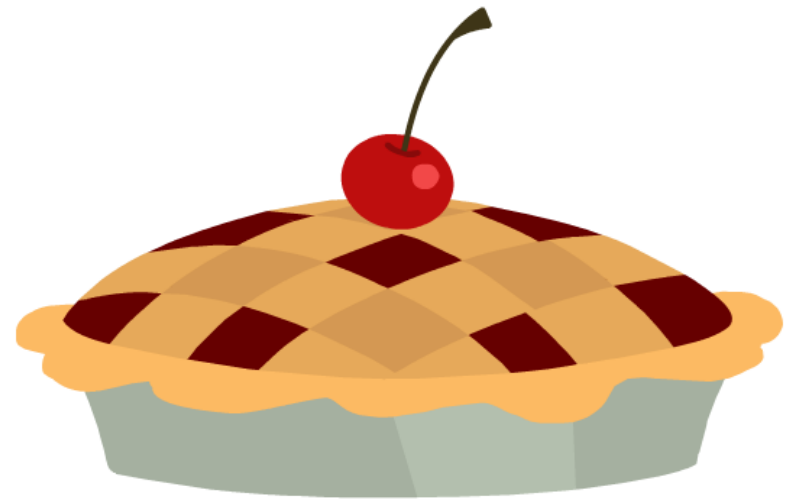


Explain the **advantages** of encapsulation



Four OOP fundamentals:

- **A**bstraction
- **P**olymorphism
- **I**nheritance
- **E**ncapsulation



Example

```
/* File name : RunEncap.java */
public class RunEncap{
    public static void main(String args[]){
        EncapTest encap = new EncapTest();
        encap.setName("James");
        encap.setAge(20);
        encap.setIdNum("12343ms");

        System.out.print("Name : " + encap.getName()+
            " Age : "+ encap.getAge())
    }
}
```

```
/* File name : EncapTest.java */
public class EncapTest{

    private String name;
    private String idNum;
    private int age;

    public int getAge() {
        return age;
    }

    public String getName() {
        return name;
    }

    public String getIdNum() {
        return idNum;
    }

    public void setAge( int newAge) {
        age = newAge;
    }

    public void setName(String newName) {
        name = newName;
    }

    public void setIdNum( String newId) {
        idNum = newId;
    }
}
```

Advantages

- The main benefit of encapsulation is the ability to **modify** our implemented code **without breaking the code** of others who use our code.
- With this feature **encapsulation** gives:
 - **maintainability**;
 - **flexibility**;
 - and **extensibility** to code