

Object Oriented Programming: Lab Book

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Topic 1: Revision

Monday 14 September 2020 21:14

Develop an application that allows the user to play a Hangman game. The game should store a secret word (which you can choose and hard code in to a variable) and allow the user to guess the word one letter at a time. The game should begin by printing a * for every letter in the word. When the user guesses a letter correctly, that letter should replace the appropriate * and the updated string should be printed to the user.

For example, if the secret word is house, the application first prints ***** and when the user guesses the letter o the output should be *o***.

Step 1: Understand the problem

Explain the problem in your own words: Design an app lets a person input a letter into a system of strings to try reveal a word with limited number of wrong attempts

List the concepts addressed in Intro. To Programming that will be required in this application: IF statements, Else statements, Strings, Classes and Loops

Identify 3 concepts which you will need to revise in order to build this application

Step 2: Revision

Take the time to revise the concepts identified in step 3. Review examples and videos from Introduction to Programming if needed.

Step 3: Design

Plan your solution using at least one of the following:

1. **IPO Diagram**
2. **Object Diagram**
3. **Class Diagram**

You can use Draw.io or another appropriate application to create your diagram(s) and then paste here:

Step 5: Development & Debugging

Develop your application using Netbeans.

As you debug your application, make note of 3 of your error messages and how you resolved them:

- 1.
- 2.
- 3.

Once your application is complete, add some screen shots of the running application here:

Zip your completed Netbeans project and attach it here:

Step 6: Testing

Once your application is complete, document and execute a series of appropriate tests:

| Test # | Description | Test Data | Expected Result | Actual Result | Pass/Fail | Comments |
|--------|-------------|-----------|-----------------|---------------|-----------|----------|
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Step 7: Additional functionality

Add the following functionality to your application: (complete each feature before moving on to the next)

- Add functionality to the app to allow the user to guess a letter 10 times and give the appropriate output each time
- Add further functionality to check if the user has guessed the word completely. If they have, stop allowing guesses and output a message "Congratulations, you win!". If they have not guessed the full word correctly, continue playing the game until they reach 10 guesses
- Give the user an instruction at the start of the game to inform them that they have 5 lives. Each time they guess a letter which is not present in the word one life is lost. When all lives have gone, the game should end
- Give the user an instruction at the start of the game to inform them that they have 5 lives. Each time they guess a letter which is not present in the word one life is lost.

When all lives have gone, the game should end

- Finally, modify the application so that when the game ends the user is asked would they like to play again. At this point, a new secret word should be chosen and the lives and guesses reset to 5 and 10

Topic 2: Inheritance (5%)

Monday 14 September 2020 21:50

Step 1: Research - In class on Tuesday October 6th

Explain the concept of Inheritance in your own words:

Inheritance is when one class takes the features of another class

Find, copy and paste a coded example of Inheritance in use in java. Remember to add a reference to where you found the code.

Highlight what you think are the important parts of the code relating to Inheritance and try to explain what these parts of the code do.

```
//Java program to illustrate the
// concept of inheritance

// base class
class Bicycle
{
    // the Bicycle class has two fields
    public int gear;
    public int speed;

    // the Bicycle class has one constructor
    public Bicycle(int gear, int speed)
    {
        this.gear = gear;
        this.speed = speed;
    }

    // the Bicycle class has three methods
    public void applyBrake(int decrement)
    {
        speed -= decrement;
    }

    public void speedUp(int increment)
    {
        speed += increment;
    }

    // toString() method to print info of Bicycle
    public String toString()
    {
        return("No of gears are "+gear
            +"\n"
            + "speed of bicycle is "+speed);
    }
}

// derived class
class MountainBike extends Bicycle
{
    // the MountainBike subclass adds one more field
```

```

public int seatHeight;

// the MountainBike subclass has one constructor
public MountainBike(int gear,int speed,
                    int startHeight)
{
    // invoking base-class(Bicycle) constructor
    super(gear, speed);
    seatHeight = startHeight;
}

// the MountainBike subclass adds one more method
public void setHeight(int newValue)
{
    seatHeight = newValue;
}

// overriding toString() method
// of Bicycle to print more info
@Override

public String toString()
{
    return (super.toString()+
           "\nseat height is "+seatHeight);
}
}

// driver class
public class Test
{
    public static void main(String args[])
    {
        MountainBike mb = new MountainBike(3, 100, 25);
        System.out.println(mb.toString());
    }
}

```

<https://www.geeksforgeeks.org/inheritance-in-java/>

Find, copy and paste a coded example of Inheritance in a language other than java. Highlight the differences in the syntax of this language versus java.

```

#include <iostream>
using namespace std;
class Teacher {
public:
    Teacher(){
        cout<<"Hey Guys, I am a teacher"<<endl;
    }
    string collegeName = "Beginnersbook";
};

//This class inherits Teacher class
class MathTeacher: public Teacher {
public:
    MathTeacher(){

```

```
    cout<<"I am a Math Teacher"<<endl;
}
string mainSub = "Math";
string name = "Negan";
};
int main() {
    MathTeacher obj;
    cout<<"Name: "<<obj.name<<endl;
    cout<<"College Name: "<<obj.collegeName<<endl;
    cout<<"Main Subject: "<<obj.mainSub<<endl;
    return 0;
}
```

Step 2: Video Content - before class on Monday October 11th

- Watch the videos [Constructors](#), [Inheritance1](#) and [Inheritance2](#) on YouTube

Make notes while you watch the video. You may use a pen and paper for this or jot your notes directly into your lab book. If you use a pen and paper, take a photo and add it here.

Constructors:



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Inheritance 1:



Inheritance2:



- **List 3 questions that you would like to ask in class to clarify what you learned from the videos.**

1. Is it the constructors job in code to build the code as a page etc.
2. What does it mean when it says the subclass extends the superclass.
3. Can a subclass inherit all of a superclass

Step 3: In-class Q & A Session - In class on Monday October 11th

- **Document the answers to your questions listed above.**

1. The constructors job is to create a new objects
2. It means the subclass can take more than the superclass
3. A subclass inherits all of a superclass

Inheritance Lab

Monday 14 September 2020 21:50

Step 4: Design - In class on Tuesday October 13th

The problem for today's lab is outlined below.

Your development team has been asked to develop a quiz app for students to use in their study. The app should enable lecturers to add questions relating to course content in a number of different formats. You have been tasked with developing the necessary question object(s). Each question type is outlined below with its necessary attributes.

Basic questions will have the following attributes:

- questionText
- correctAnswer
- mark (representing the mark awarded for a correct answer)
- Answer (representing the answer entered by the user)

Multiple choice questions will have the following attributes:

- questionText
- correctAnswer
- mark (representing the mark awarded for a correct answer)
- option a, option b and option c (representing each of the possible answers)
- answer (representing the answer chosen by the user)

Essay Questions will have the following attributes:

- questionText
- correctAnswer
- mark (representing the mark awarded for a correct answer)
- answer (representing the text entered by the user)
- maxWordCount (representing the maximum word count for the essay)

Read the problem and then plan your solution using at least one of the following:

1. **IPO Diagram**
2. **Object Diagram**
3. **Class Diagram**

You can use Draw.io or another appropriate application to create your diagram(s) and then paste here:



Untitled
Diagram

Step 5: Development & Debugging - In class on Tuesday October 13th

Develop your application using Netbeans.

As you debug your application, make note of 3 of your error messages and how you resolved them:

- 1.Put strings in app instead of class. resolved by moving them
- 2.Field opt1, opt2, opt3 can be final. Disappeared when I finished setters and getters.
- 3.

Once your application is complete, add some screen shots of the running application here:

Zip your completed netbeans project and attach it here:



inheritanc...

Step 6: Testing - In class on Tuesday October 13th

Once your application is complete, document and execute a series of appropriate tests:

| Test # | Description | Test Data | Expected Result | Actual Result | Pass/Fail | Comments |
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Topic 3: Polymorphism (5%)

Monday 14 September 2020 21:08

Step 1: Research - to be completed before watching the videos

Explain the concept of Polymorphism in your own words:

A code that takes on many different forms

Find, copy and paste a coded example of Polymorphism in use in java. Remember to add a reference to where you found the code.

Highlight what you think are the important parts of the code relating to polymorphism and try to explain what these parts of the code do.

```
class Animal {  
    public void animalSound() {  
        System.out.println("The animal makes a sound");  
    }  
}
```

```
class Pig extends Animal {  
    public void animalSound() {  
        System.out.println("The pig says: wee wee");  
    }  
}
```

```
class Dog extends Animal {  
    public void animalSound() {  
        System.out.println("The dog says: bow wow");  
    }  
}
```

```
class MyMainClass {  
    public static void main(String[] args) {  
        Animal myAnimal = new Animal();  
        // Create a Animal object  
  
        Animal myPig = new Pig();  
    }  
}
```

```

// Create a Pig object

Animal myDog = new Dog();
// Create a Dog object

myAnimal.animalSound();

myPig.animalSound();

myDog.animalSound();
}
}

```

Find, copy and paste a coded example of Polymorphism in a language other than java:

```

// Base class
class Animal {
    public:
        void animalSound() {
            cout << "The animal makes a sound \n" ;
        }
};

// Derived class
class Pig : public Animal {
    public:
        void animalSound() {
            cout << "The pig says: wee wee \n" ;
        }
};

// Derived class
class Dog : public Animal {
    public:
        void animalSound() {
            cout << "The dog says: bow wow \n" ;
        }
};

int main() {
    Animal myAnimal;
    Pig myPig;
    Dog myDog;

    myAnimal.animalSound();
    myPig.animalSound();
    myDog.animalSound();
    return 0;
}

```

Step 2: Video Content - to be completed before class on Monday October 19th

- Watch the videos [Polymorphism 1](#) and [Polymorphism 2](#) on Youtube

Make notes while you watch the videos. You may use a pen and paper for this or jot your notes directly into your lab book. If you use a pen and paper, take a photo and add it here.

Polymorphism is the ability to refer to an object using its actual form or a parent form

polymorphism can only occur when one class is inherited from the other

We can construct objects cording to the type of class we want at a later stage

The instanceof keyword helps us see how an object was constructed

- **List 3 questions that you would like to ask in class to clarify what you learned from the videos.**

1. Why is polymorphism only allowed with inheritance?
2. Is it only in superclass and subclass relationships or are there other examples?
3. How does a code become a polymorphism code?

Step 3: In-class Q & A Session to be completed in class on Monday October 19th

- **Document the answers to your questions listed above.**

1. It is loosely tied to inheritance but not fully.
2. It can occur in a single class as well as super and subclass
3. Multiple methods with the same name.

Polymorphism Lab

Monday 14 September 2020 21:08

The problem for today's lab is outlined below.

Develop an application for an accommodation booking system for a Holiday Resort. The system must handle bookings for both the Hotel rooms and Self Catering Cottages. All bookings will require a `clientName`, a `bookingReference`, a `startDate` and a duration in nights.

Bookings for the Hotel Rooms will also then have a `roomNumber` and whether or not breakfast is included.

Bookings for the Cottages will have an address and a `keyCollectionPoint` which is represented by a single letter.

The application should enable you to create bookings of type Hotel or Cottage with all of the necessary info and then calculate the total cost of the booking based on the following:

- Hotel rooms cost 130 euro per night and breakfast is charged at 10euro extra per night.
- Cottages cost 60 euro per night with an additional once of charge of 50 euro for electricity.

Step 4: Design

Design your application using at least one of the following:

1. **IPO Diagram**
2. **Object Diagram**
3. **Class Diagram**

You can use Draw.io or another appropriate application to update your diagram(s) and then paste here:



Booking
diagram

Step 5: Development & Debugging

Develop your application using Netbeans.

As you debug your application, make note of 3 of your error messages and how you resolved them:

1. Reached end of file while parsing. Added a `}` and fixed it.
2. Booking is not abstract and does not override abstract method `computePrice()` in Booking. Changed booking to an abstract class
3. Package `b1` does not exist.

Once your application is complete, add some screen shots of the running application here:

Zip your completed netbeans project and attach it here:



BookingApp

Step 6: Testing

Once your application is complete, document and execute a series of appropriate tests:

| Test # | Description | Test Data | Expected Result | Actual Result | Pass/Fail | Comments |
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Topic 4: OO Principles and Design Patterns (5%)

Monday 14 September 2020 21:08

Step 1: Research to be completed before your next class

Explain the concept of Design Patterns in your own words:

Reusable solution for common problems

Where, or with whom, did Design Patterns Originate?

Design pattern originated with "the gang of four" book

List 3 Design Pattern Classifications. Briefly (one or two lines) explain each of these in your own words and provide an example of a pattern in each classification.

- 1.Creational. This is a pattern that hides the logic allowing it to be more flexible
- 2.Structural. These design patterns have a class and object in them eg. inheritance.
- 3.Behavioral. These design patterns are for objects to communicate to each other.

Give the links for 3 online resources which you found useful when exploring the concept of Design Patterns

1. https://www.tutorialspoint.com/design_pattern/design_pattern_overview.htm#:~:text=As%20per%20the%20design%20pattern,design%20pattern%3A%20J2EE%20design%20patterns.
2. <https://www.oodeesign.com/>
3. <https://springframework.guru/gang-of-four-design-patterns/>

- **Having done your research list 3 questions that you would like to ask in class to clarify what you learned so far.**

1. What are some disadvantages of one pattern compared to another
2. Can you have two patterns on the same class
- 3.

Step 2: In-class Q & A Session to be completed in class

- **Document the answers to your questions listed above.**

- 1.
2. Can depending on the program that is running.
- 3.

OO Principles & Design Lab

Wednesday 23 September 2020 21:46

21:08

The problem for todays lab is outlined below.

Develop an application that enables the user to generate either a Christmas, Wedding, or Birthday Greeting card. The application should create objects of either type Christmas, Wedding or Birthday with parameters for recipient and sender.

Each card should comprise each of the following methods:

- initialise() – to initialise arrays of predefined salutations, verses and closings dependent on the type of card
- salutation() – to choose a random salutation from the array and print alongside the recipient name
- verse() – to choose and print a random verse from the array
- closing() – to choose a random closing from the array and print alongside the sender name

Apply the Template Design Patter in your solution.

Step 4: Design

Design your application using at least one of the following:

1. **IPO Diagram**
2. **Object Diagram**
3. **Class Diagram**

You can use Draw.io or another appropriate application to update your diagram(s) and then paste here:

Step 5: Development & Debugging

Develop your application using Netbeans.

As you debug your application, make note of 3 of your error messages and how you resolved them:

- 1.
- 2.
- 3.

Once your application is complete, add some screen shots of the running application here:

Zip your completed netbeans project and attach it here:



Greetingc...

Step 6: Testing

Once your application is complete, document and execute a series of appropriate tests:

| Test # | Description | Test Data | Expected Result | Actual Result | Pass/Fail | Comments |
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Topic 5: Arrays of Objects & ArrayLists (5%)

Monday 14 September 2020 21:58

Step 1: Research to be completed before your next class after reading week

In your own words, define the terms *Array of Objects* and *ArrayList* and explain the difference between the two:

An array is a basic function provided by Java.

An arraylist is part of collection framework in Java.

The difference is that arrays are fixed size where as an arraylist is resizable.

Write the java code to declare and create an array of 100 *Book* objects called *library*

Click or tap here to enter text.

Write the java code to declare and create an ArrayList of 20 *Car* objects called *garage*

Click or tap here to enter text.

Find a coded Java example which demonstrates the use of either an ArrayList or an Array of Objects. Remember to add a reference to where you found the code.

```
class Main {  
    public static void main(String[] args) {  
  
        // create an array  
        int[] age = {12, 4, 5, 2, 5};  
  
        // access each array elements  
        System.out.println("Accessing Elements of Array:");  
        System.out.println("First Element: " + age[0]);  
        System.out.println("Second Element: " + age[1]);  
        System.out.println("Third Element: " + age[2]);  
        System.out.println("Fourth Element: " + age[3]);  
        System.out.println("Fifth Element: " + age[4]);  
    }  
}
```

<https://www.programiz.com/java-programming/arrays>

Find a coded example in a language other than java which demonstrates the use of either an ArrayList or an Array of Objects. Remember to add a reference to where

you found the code.

```
import array as arr

numbers_list = [2, 5, 62, 5, 42, 52, 48, 5]
numbers_array = arr.array('i', numbers_list)

print(numbers_array[2:5])# 3rd to 5th

print(numbers_array[:-5])# beginning to 4th

print(numbers_array[5:]) # 6th to end
print(numbers_array[:]) # beginning to end
```

Step 2: Video Content - to be completed before class on Monday November 16th

Watch the videos [Arrays of Objects](#) and [AarrayLists](#) on Youtube

Make notes while you watch the videos. You may use a pen and paper for this or jot your notes directly into your lab book. If you use a pen and paper, take a photo and add it here.



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- Having done your research and watched the videos, list 3 questions that you would like to ask in class to clarify what you learned so far.

1. Can both be used in the same code?
2. Can details in an array of objects be changed or would you have to use an arraylist?
3. Is there disadvantages to using one compared to the other if both can be used?

Step 3: In-class Q & A Session to be completed in class on Monday November 16th

- **Document the answers to your questions listed above.**

1. Yes they can but not good practice
2. Yes it can be changed
3. There is no disadvantages

Arrays of Objects & ArrayLists Lab

Wednesday 23 September 2020 21:46

21:08

The problem for today's lab is outlined below.

When we looked at Inheritance, you were asked to develop a quiz app for students to use in their study. The app should enable lecturers to add questions relating to course content in a number of different formats. You were tasked with developing the necessary question object(s). Each question type is outlined below with its necessary attributes.

Basic questions will have the following attributes:

- questionText
- correctAnswer
- mark (representing the mark awarded for a correct answer)
- Answer (representing the answer entered by the user)

Multiple choice questions will have the following attributes:

- questionText
- correctAnswer
- mark (representing the mark awarded for a correct answer)
- option a, option b and option c (representing each of the possible answers)
- answer (representing the answer chosen by the user)

Essay Questions will have the following attributes:

- questionText
- correctAnswer
- mark (representing the mark awarded for a correct answer)
- answer (representing the text entered by the user)
- maxWordCount (representing the maximum word count for the essay)

Today you are required to build on this application developed previously so that a user can **add**, **print**, **search** for and **delete** questions. Your application should make use of either **arrays of objects** or **ArrayLists** to store the questions. If you didn't develop the application previously then you will need to do so now. You can use System.out and JOptionPane to handle user input and output.

Your previous application should already contain a superclass and two subclasses along with an app class. You should now add a UI class with a menu method similar to the one used in the lecture example and use your app class to just create an instance of this UI class and trigger the menu method.

Step 4: Design

Design your application using at least one of the following:

1. **IPO Diagram**
2. **Object Diagram**
3. **Class Diagram**

You can use Draw.io or another appropriate application to update your diagram(s) and then paste here:

Step 5: Development & Debugging

Develop your application using Netbeans.

As you debug your application, make note of 3 of your error messages and how you resolved them:

- 1.
- 2.
- 3.

Once your application is complete, add some screen shots of the running application here:

Zip your completed netbeans project and attach it here:



Inheritanc...

Step 6: Testing

Once your application is complete, document and execute a series of appropriate tests:

Be sure to test each piece of functionality i.e. Add, display, search and delete.

| Test # | Description | Test Data | Expected Result | Actual Result | Pass/Fail | Comments |
|--------|-------------|-----------|-----------------|---------------|-----------|----------|
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Topic 6: GUI Objects & Event Driven Programming (5%)

Monday 14 September 2020 21:58

Step 1: Research to be completed before your next class after reading week

In your own words, explain what is meant by Event Driven Programming and how does this differ from procedural programming?

Event driven programs executes based on the actions preformed on the program. Whereas procedural direct the flow of data and control.

Explain the key components of event driven programming:

Event Object

Events are tied to objects. Basically, the event itself is an object, thus we refer to this general concept as the **event object**.

Event Source

The **event source** is object that is triggered in the event.

Event Listener

It is program code that listens for changes, additions, user interaction, etc.

What is Java Swing? Give a coded example of its use.

It is a toolkit for java

Find a coded Java example which demonstrates the use of event driven programming

Click or tap here to enter text.

Find a coded example in a language other than java which demonstrates the use of event driven programming:

Click or tap here to enter text.

Explore how to create a JFrame Form using netbeans. Create your own JFrame form and add some components to it. Paste a screenshot of your JFrame here:

Click or tap here to enter text.

Step 2: Video Content - to be completed before class on Monday November 16th

Watch the videos on [Swing & Event Handling](#) on Youtube

Make notes while you watch the videos. You may use a pen and paper for this or jot your notes directly into your lab book. If you use a pen and paper, take a photo and add it here.



- **Having done your research and watched the videos, list 3 questions that you would like to ask in class to clarify what you learned so far.**

1. Which is easier to do notification based or read-evaluation based

2. Which is used more often
3. Is there better advantages to using one over the other

Step 3: In-class Q & A Session to be completed in class on Monday

- **Document the answers to your questions listed above.**

1. It is context dependent.
- 2.
- 3.

GUI Objects and Event driven Programming Lab

Wednesday 23 September 2020 21:47

The problem for todays lab is outlined below.

Each year, more and more people are moving to online shopping for their Christmas gifts (this year especially!). The trouble is, when browsing so many websites, it can be difficult to keep track of gift ideas and where you saw them. Your task today is to develop an application that will help a user to keep track of potential Christmas gifts. The application should accept the recipient name, gift idea and a URL for that gift from the user and store them in an appropriate data structure (array or ArrayList of objects). The application should have a full swing user GUI and allow the user to add gift ideas, delete gift ideas, display all gift ideas, and search for a gift by recipient name.

Step 4: Design

Design your application using at least one of the following:

1. **IPO Diagram**
2. **Object Diagram**
3. **Class Diagram**

You can use Draw.io or another appropriate application to update your diagram(s) and then paste here:

Design your applications user interface:

You can use Draw.io or another appropriate application, or a pen and paper to create your user interface mock-up and then paste here:

Step 5: Development & Debugging

Develop your application using Netbeans.

As you debug your application, make note of 3 of your error messages and how you resolved them:

- 1.
- 2.
- 3.

Once your application is complete, add some screen shots of the running application here:

Zip your completed netbeans project and attach it here:

Step 6: Testing

Once your application is complete, document and execute a series of appropriate tests:

Be sure to test each piece of functionality i.e. Add, display, search and delete.

| Test # | Description | Test Data | Expected Result | Actual Result | Pass/Fail | Comments |
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Topic 7: File I/O & Exceptions (5%)

Monday 14 September 2020 21:59

Step 1: Research to be completed before your next class after reading week

In your own words, explain what is meant by File Handling in programming?

File handling is storing data in files using a program

Why would we use File Handling in programming?

We use it as it is easier because it's not all being stored in bulk and file handling programs are reusable as well

What is the name of the package required in order to carry out File Handling in java:

java.io.file

Name 3 of the classes which can be used in File Handling in java.

Click or tap here to enter text.

How does file handling in java differ when dealing with text versus dealing with objects?

Click or tap here to enter text.

Find a coded example java which demonstrates the use of file handling:

```
package FileHandling;

// Import the File class
import java.io.File;

// Import this class to handle errors
import java.io.FileNotFoundException;

// Import the Scanner class to read text files
import java.util.Scanner;
```



```

public class ReadFromFile {
public static void main(String[] args) {
try {
// Creating an object of the file for reading the data
File myObj = new File("D:FileHandlingNewFilef1.txt");
Scanner myReader = new Scanner(myObj);
while (myReader.hasNextLine()) {
String data = myReader.nextLine();
System.out.println(data);
}
myReader.close();
} catch (FileNotFoundException e) {
System.out.println("An error occurred.");
e.printStackTrace();
}
}
}

```

Find a coded example in a language other than java which demonstrates the use of file handling:

```

// C program to Open a File,
// Write in it, And Close the File

# include <stdio.h>
# include <string.h>

int main( )
{

    // Declare the file pointer
    FILE *filePointer ;

    // Get the data to be written in file
    char dataToBeWritten[50]
        = "GeeksforGeeks-A Computer Science Portal for Geeks";

    // Open the existing file GfgTest.c using fopen()
    // in write mode using "w" attribute
    filePointer = fopen("GfgTest.c", "w") ;

    // Check if this filePointer is null
    // which maybe if the file does not exist
    if ( filePointer == NULL )
    {

```

```
    printf( "GfgTest.c file failed to open." ) ;
}
else
{

    printf("The file is now opened.\n") ;

    // Write the dataToBeWritten into the file
    if ( strlen ( dataToBeWritten ) > 0 )
    {

        // writing in the file using fputs()
        fputs(dataToBeWritten, filePointer) ;
        fputs("\n", filePointer) ;
    }

    // Closing the file using fclose()
    fclose(filePointer) ;

    printf("Data successfully written in file GfgTest.c\n");
    printf("The file is now closed." ) ;
}
return 0;
}
```

Step 2: Video Content - to be completed before class on Monday November 16th

Watch the videos on [File I/O with Text](#) and [File I/O with Objects](#) on Youtube

Make notes while you watch the videos. You may use a pen and paper for this or jot your notes directly into your lab book. If you use a pen and paper, take a photo and add it here.



×

- **Having done your research and watched the videos, list 3 questions that you would like to ask in class to clarify what you learned so far.**

1. How do you determine which stream to use?
2. What is meant by hierarchy of object references?
3. Is serialization only in object streams or do text streams have them?

Step 3: In-class Q & A Session to be completed in class on

- **Document the answers to your questions listed above.**

- 1.
- 2.
3. Its only in objects streams

File I/O & Exceptions Lab

Wednesday 23 September 2020 21:47

The problem for todays lab is outlined below.

In last weeks lab you developed an application to help a user to keep track of potential Christmas gifts. The application should accept the recipient name, gift idea and a URL for that gift from the user and store them in an appropriate data structure (array or ArrayList of objects). The application should have a full swing user GUI and allow the user to add gift ideas, delete gift ideas, display all gift ideas, and search for a gift by recipient name.

Today your task is to further develop that application by adding save and load buttons which would save the Christmas gift list to a file and then load it back in again when the app is opened and the load button is pressed.

Step 4: Design

Design your applications user interface:

You can use Draw.io or another appropriate application, or a pen and paper to create your user interface mock-up and then paste here:

Step 5: Development & Debugging

Develop your application using Netbeans.

As you debug your application, make note of 3 of your error messages and how you resolved them:

- 1.
- 2.
- 3.

Once your application is complete, add some screen shots of the running application here:

Zip your completed netbeans project and attach it here:

Step 6: Testing

Once your application is complete, document and execute a series of appropriate tests:

Be sure to test each piece of functionality including original functionality i.e. Add, display, search and delete, save, load.

| Test # | Description | Test Data | Expected Result | Actual Result | Pass/Fail | Comments |
|--------|-------------|-----------|-----------------|---------------|-----------|----------|
| | | | | | | |
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Topic 8: Data Connectivity (5%)

Monday 14 September 2020 21:59

Step 1: Research to be completed before your next class

Explain, in your own words, what is JDBC?

JDBC is an app that shows how a client can access a database.

Explain in your own words why we would need/want to use JDBC?

It is needed to give a pure java solution for an app development.

What are the 5 steps to connect a java application with a database using JDBC?

1. Register the Driver class
2. Create Connection
3. Create Statement
4. Execute queries
5. Close Connection

Give the links for 3 online resources which you found useful when exploring the concept of JDBC

1. <https://www.javatpoint.com/steps-to-connect-to-the-database-in-java>
2. <https://www.progress.com/faqs/datadirect-jdbc-faqs/how-does-jdbc-work>
3. <https://www.infoworld.com/article/3388036/what-is-jdbc-introduction-to-java-database-connectivity.html>

- **Having done your research list 3 questions that you would like to ask in class to clarify what you learned so far.**

1. What does the term pure java mean
2. Which is more common ODBC or JDBC
3. Can JDBC only be used in java

Step 2: In-class Q & A Session to be completed in class

- **Document the answers to your questions listed above.**

1.

2.

3. Yes it can only be used in java

Data Connectivity Lab

Wednesday 23 September 2020 21:47

The problem for todays lab is outlined below.

Develop an application that would enable the user to maintain a list of Movies they would like to watch on TV this Christmas. The application should store the details of each movie and when it will be on TV (Title, Day, Time) and enable the user to add new movies, display all movies, search for movies by day and delete a movie by title. The application should have a full swing user GUI and use a mysql database to store the data.

Step 4: Design

Create the necessary database table to store the data using mysql workbench:

Add a screen shot showing that you have successfully created the table in MySql workbench :

Step 5: Development & Debugging

Develop your application using Netbeans.

As you debug your application, make note of 3 of your error messages and how you resolved them:

- 1.
- 2.
- 3.

Once your application is complete, add some screen shots of the running application here:

Zip your completed netbeans project and attach it here:

Step 6: Testing

Once your application is complete, document and execute a series of appropriate tests:

Be sure to test each piece of functionality including original functionality i.e. Add, display, search and delete, save, load.

| Test # | Description | Test Data | Expected Result | Actual Result | Pass/Fail | Comments |
|--------|-------------|-----------|-----------------|---------------|-----------|----------|
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Topic 9: Programming in Different Languages (15%)

Monday 14 September 2020 21:59

In previous labs we have done a little exploration of languages other than java. For this topic we will build on that work.

You will choose one programming language that is not java. You will then research this language further to explore how 3 of the topics addressed in this module (Inheritance, Polymorphism, Design Patterns, Arrays, GUI, File I/O, Data Connectivity) would be implemented using your chosen language. For each of your chosen topics you should address the following:

Chosen Language: Python

Topic 1: Inheritance

Explain, the topic in your own words

Inheritance is when certain variables and elements are passed from a superclass(parent class) to a sub class(child class) so that they do not need to be typed up again

Find, copy and paste and explain a coded example of how this topic is implemented in your chosen language:

```
class Polygon:
    def __init__(self, no_of_sides):
        self.n = no_of_sides
        self.sides = [0 for i in range(no_of_sides)]

    def inputSides(self):
        self.sides = [float(input("Enter side "+str(i+1)+" : ")) for i in range(self.n)]

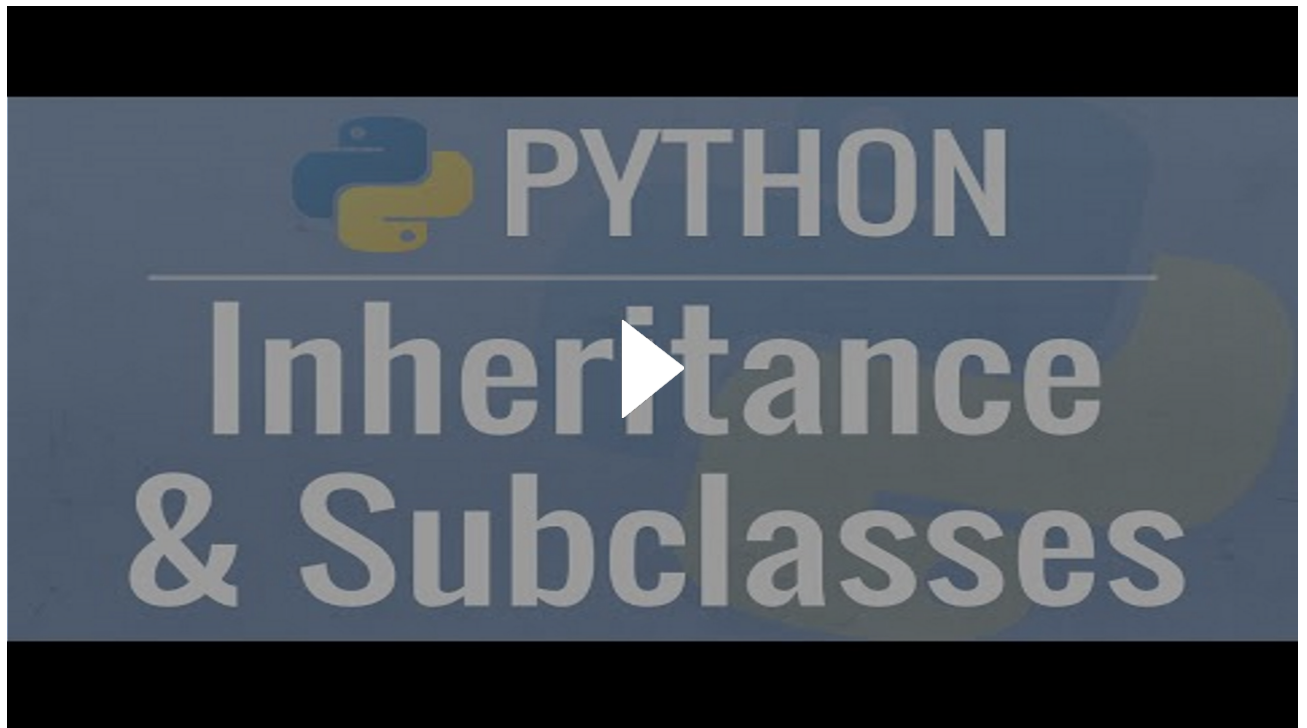
    def dispSides(self):
        for i in range(self.n):
            print("Side",i+1,"is",self.sides[i])
```

This code is showing how to inherit in python you have to use "`__init__`" this code is part of a bigger project but I just took a small sample out of it

Find an online tutorial which explains how to implement this topic in your chosen language. Give a brief overview of the tutorial and provide the URL.

[Python OOP Tutorial 4: Inheritance - Creating Subclasses](#)

Shows that when inheriting in python you don't need to use "extends" you just have to say what class you're inheriting from. Also talking about the `__init__` method.



Reflect on what you have learned about this topic in doing this research and note any questions you have about the topic when applied to this language.

I learned that inheriting in python is very similar bar one or two differences such as the init method and that we dont need extends.

Topic 2: Polymorphism

Explain, the topic in your own words

Polymorphism is code that can use different variables at different times.

Find, copy and paste and explain a coded example of how this topic is implemented in your chosen language:

```
class Cat:

    def __init__(self, name, age):
        self.name = name
        self.age = age

    def info(self):
        print(f"I am a cat. My name is {self.name}. I am {self.age} years old.")

    def make_sound(self):
        print("Meow")
```

```

class Dog:

    def __init__(self, name, age):
        self.name = name
        self.age = age

    def info(self):
        print(f"I am a dog. My name is {self.name}. I am {self.age} years old.")

    def make_sound(self):
        print("Bark")

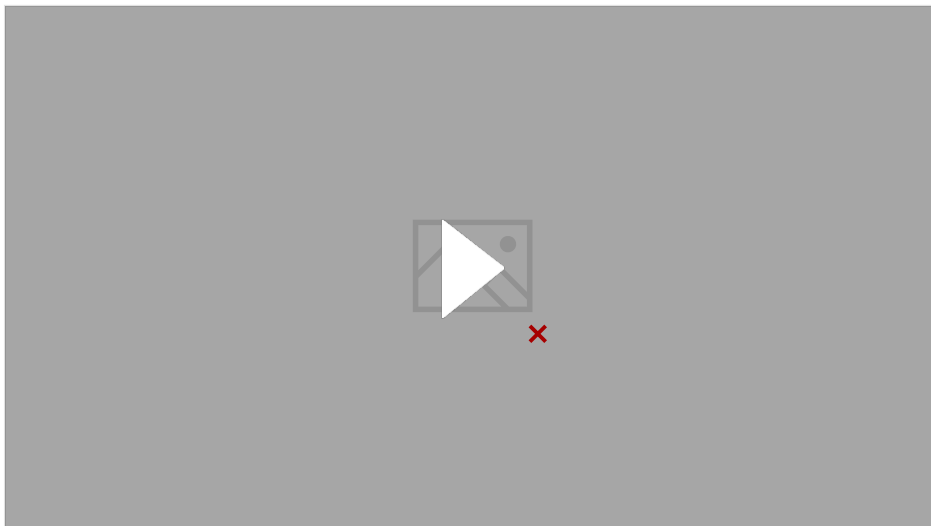
cat1 = Cat("Kitty", 2.5)
dog1 = Dog("Fluffy", 4)

for animal in (cat1, dog1):
    animal.make_sound()
    animal.info()
    animal.make_sound()

```

Polymorphism is implemented in this code in the terms of self name and self age as these two parts of the code can be used for other things not just pets.

Find an online tutorial which explains how to implement this topic in your chosen language. Give a brief overview of the tutorial and provide the URL. [Python Programming Tutorial: An Introduction to Polymorphism](#)



Reflect on what you have learned about this topic in doing this research and note any questions you have about the topic when applied to this language.

Topic 3: Design Patterns

Explain, the topic in your own words

Code that can be used and reused again as a solution for many different issues

Find, copy and paste and explain a coded example of how this topic is implemented in your chosen language:

```
class ContentFilter(object):

    def __init__(self, filters=None):
        self._filters = list()
        if filters is not None:
            self._filters += filters

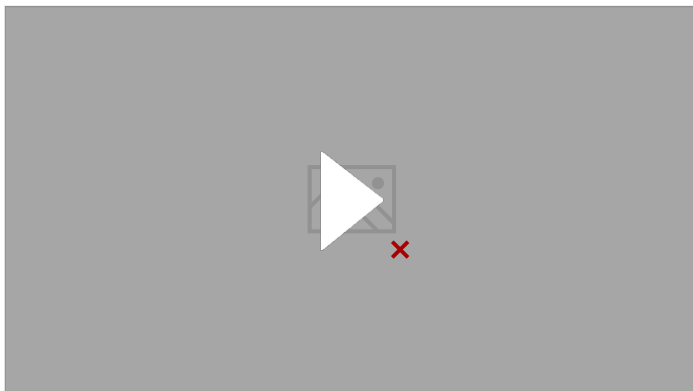
    def filter(self, content):
        for filter in self._filters:
            content = filter(content)
        return content

filter = ContentFilter([
    offensive_filter,
    ads_filter,
    porno_video_filter])
filtered_content = filter.filter(content)
```

The design pattern in this is the filter code as it can filter many things and not just ads or offensive content.

Find an online tutorial which explains how to implement this topic in your chosen language. Give a brief overview of the tutorial and provide the URL.

[Design Patterns - Python](#)



Reflect on what you have learned about this topic in doing this research and note any questions you have about the topic when applied to this language.

Week 3 Exercises

Monday 12 October 2020 13:32