

### CA 3: Experiential Learning

Group Members:

Sr. No.	PRN	Name of Student	Mail id
1	22070122031	Arnav Khandelwal	arnav.khandelwal.btech2022@sitpune.edu.in
2	22070122036	Aashmit Mckenzie	aashmit.mckenzie.btech2022@sitpune.edu.in
3	22070122038	Atharva Gondhali	atharva.gondhali.btech2022@sitpune.edu.in

Problem Statement:

To create a C++ program for an Animal Information System that allows users to choose a particular animal from a given list and learn the basics of it like their diet and the region they are usually found in.

Explanation:

This is a menu-driven code that allows the user to select any animal and get its details, this program contains the following details:

1. Name
2. Place in the Animal Kingdom
3. Type of Blood
4. Diet
5. Places usually found in

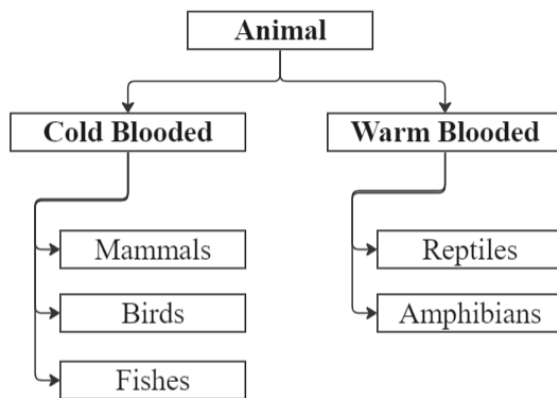
This code was written with the help of multilevel inheritance and polymorphism.

Polymorphism is used in 2 ways:

1. Array of Animal Pointers:  
In your code, you create an array of pointers to Animal objects: `Animal* animals[max_animals]`. These pointers can point to objects of the base class and any of its derived classes. For example, you can point an `Animal*` pointer to a Mammal object.
2. Polymorphic Behavior:  
In the `main()` function, you display a list of animal names, and then take user input to choose an animal. When you call `animals[choice-1]->put_data();`, polymorphism comes into play
3. Derived Classes:  
You have several derived classes that inherit from the Animal class, such as Mammal, Bird, Fish, Reptiles, and Amphibians. These derived classes override the `put_data()` function.

Inheritance is used as shown in the diagram below.

Class Diagram:



Code snippets:

```
class Animal {
public:
    string name, blood, kingdom, food, sounds, reg;

    Animal(string name, string blood, string kingdom, string food, string sounds, string reg)
        : name(name), blood(blood), kingdom(kingdom), food(food), sounds(sounds), reg(reg) {

    }

    void put_data() {
        cout.setf(ios::left, ios::adjustfield); cout.width(20);
        cout<<endl<<"Animal Name "<<"-> "<<name<<endl;
        cout.setf(ios::left, ios::adjustfield); cout.width(20);
        cout<<"Blood Temperature "<<"-> "<<blood<<endl;
        cout.setf(ios::left, ios::adjustfield); cout.width(20);
        cout<<"Kingdom "<<"-> "<<kingdom<<endl;
        cout.setf(ios::left, ios::adjustfield); cout.width(20);
        cout<<"Diet "<<"-> "<<food<<endl;
        cout.setf(ios::left, ios::adjustfield); cout.width(20);
        cout<<"Sound: "<<"-> "<<sounds<<endl;
        cout.setf(ios::left, ios::adjustfield); cout.width(20);
        cout<<"Commonly Found In "<<"-> "<<reg<<endl;
    }
};
```

```
class ColdBlood : public Animal {
public:
    ColdBlood(string name, string kingdom, string food, string reg, string sounds)
        : Animal(name, "Cold Blooded", kingdom, food, reg, sounds){
    }
};

class Mammal : public WarmBlood {
public:
    Mammal(string name, string food, string reg, string sounds)
        : WarmBlood(name, "Mammal", food, reg, sounds){
    }
};

class Bird : public WarmBlood {
public:
    Bird(string name, string food, string reg, string sounds)
        : WarmBlood(name, "Bird", food, reg, sounds){
    }
};
```

```

int main(){
    data_mammal();
    data_bird();
    data_fish();
    data_reptile();
    data_amphibians();

    int choice;
    do{
        for(int i=0;i<max_animals;i++){
            cout<<i+1<<". ";
            cout.setf(ios::left, ios::adjustfield);
            cout.width(28);
            cout<<animals[i]->name;
            if((i+1)%5==0){
                cout<<endl;
            }
            if((i+1)%10==0){
                cout<<endl;
            }
        }

        cout<<endl<<"\nEnter Choice (1-50 for Animals Mentioned and 0 to Exit): ";
        cin>>choice;
        if(choice>1 && choice<=max_animals){
            animals[choice-1]->put_data();
            cout<<endl;
        }
        else if(choice!=0){
            cout<<"Invalid Option, Choose again"<<endl;
        }
    }while(choice!=0);
}

```

Input/Output:

```

1. Giraffe      2. Elephant    3. Humpback Whale  4. Kangaroo    5. Killer Whale
6. Lion        7. Orangutan   8. Panda           9. Polar Bear  10. Red Fox

11. American Robin  12. Australian Kookaburra  13. Bald Eagle  14. Common Loon  15. Common Nightingale
16. European Swallow  17. Indian Peafowl  18. Ostrich  19. Peregrine Falcon  20. Toucan

21. Angelfish      22. Barracuda  23. Catfish      24. Clownfish  25. Mackerel
26. Piranha        27. Salmon    28. Swordfish    29. Tuna       30. Trout

31. American Alligator  32. Anole Lizard  33. Boa Constrictor  34. Chameleon  35. Galapagos Tortoise
36. Gila Monster      37. Green Iguana  38. King Cobra      39. Komodo Dragon  40. Nile crocodile

41. African Clawed Frog  42. American Bullfrog  43. European Common  44. Fire-bellied Toad  45. Green Tree Frog
46. Japanese Giant Salamander  47. Moor Frog  48. Red-eyed Tree Frog  49. Spotted Salamander  50. Yellow-eyed Tree Frog

Enter Choice (1-50 for Animals Mentioned and 0 to Exit): 23

Animal Name      -> Catfish
Blood Temperature -> Warm Blooded
Kingdom          -> Fish
Diet             -> Omnivorous, consuming a variety of aquatic creatures
Sound:          -> Catfish communicate using vocalizations or body vibrations
Commonly Found In -> Found in freshwater habitats worldwide

1. Giraffe      2. Elephant    3. Humpback Whale  4. Kangaroo    5. Killer Whale
6. Lion        7. Orangutan   8. Panda           9. Polar Bear  10. Red Fox

11. American Robin  12. Australian Kookaburra  13. Bald Eagle  14. Common Loon  15. Common Nightingale
16. European Swallow  17. Indian Peafowl  18. Ostrich  19. Peregrine Falcon  20. Toucan

21. Angelfish      22. Barracuda  23. Catfish      24. Clownfish  25. Mackerel
26. Piranha        27. Salmon    28. Swordfish    29. Tuna       30. Trout

31. American Alligator  32. Anole Lizard  33. Boa Constrictor  34. Chameleon  35. Galapagos Tortoise
36. Gila Monster      37. Green Iguana  38. King Cobra      39. Komodo Dragon  40. Nile crocodile

41. African Clawed Frog  42. American Bullfrog  43. European Common  44. Fire-bellied Toad  45. Green Tree Frog
46. Japanese Giant Salamander  47. Moor Frog  48. Red-eyed Tree Frog  49. Spotted Salamander  50. Yellow-eyed Tree Frog

Enter Choice (1-50 for Animals Mentioned and 0 to Exit): 0

```

Github repository link:

<https://github.com/Atharva-Gondhali/Animal-Hierarchy>