CS-1004 Object Oriented Programming Fall - 2023

[Assignment – 02] **[Total Marks 100]**

Question 1: Jungle and Animals Management System in C++

Design and implement a Jungle and Animals Management System in C++ adhering to object-oriented programming principles. (only we studied so far) This system simulates the management of animals in a jungle and provides a user-friendly interface for users to interact with the program. The primary classes are Animal and Jungle, each serving distinct purposes.

Specifications:

Animal Class:

The Animal class represents individual animals in the jungle.

Private Data Members:

1. Name
2. Species
3. Age
4. Availability status (a bool indicating whether the animal is in the jungle or borrowed for research)

Member Functions:

1. Constructors:
2. Default constructor
3. Overloaded constructor for initializing animal details
4. Copy constructor
5. Destructor
6. Check availability (a constant member function to check whether the animal is in the jungle or borrowed for research).
7. Set an animal as unavailable (borrowed for research).
8. Set an animal as available (returned to the jungle).
9. Display animal information (a constant member function).
10. Retrieve animal details without modification (const member functions).
11. Static member variable to keep track of the total number of animals in the jungle.

Friend Functions:

1. Friend function displayAnimalInfo to display detailed information about an animal.
   This friend function is used to access and display private information about an animal, providing a user-friendly way to view an animal's details.
2. Friend function sortAnimalsByCriteria for sorting animals based on specific criteria.
   This friend function enables the sorting of animal objects based on age, name, or other criteria, which may require accessing private members.

Jungle Class:
The Jungle class manages the jungle's animal population.
Data Members:

1. An array of pointers to Animal objects for dynamic memory allocation.

Member Functions:

1. Add animals to the jungle.
2. Remove animals from the jungle (e.g., for research purposes).
3. Search for animals by name, species, or age (constant member functions).
4. Display all available animals in the jungle (a constant member function).
5. Calculate the total number of available animals in the jungle (a static constant member function).
6. Proper memory management in the destructor.

User Interface:
Provide a user-friendly interface for users to interact with the Jungle and Animals Management System.
Actions Available to Users:

1. Add new animals to the jungle.
2. Remove animals from the jungle for research.
3. Search for animals by name, species, or age.
4. Display all available animals in the jungle.
5. Check the total number of available animals in the jungle.

Code Structure:
Implement necessary header files for class declarations: Animal.h and Jungle.h.
Implement separate source files for class implementations: Animal.cpp and Jungle.cpp.
Implement a main function:

Question 2:

- **Instructions.**
- Combine all your work in one folder. The folder must contain only the **CPP files and header files**.
- Rename the folder as ROLL-NUM_SECTION_NAME (e.g. 22i-1234_A_Ali) and compress the folder as a zip file. (e.g. 22i-1234_A_Ali.zip).
- Do not submit .rar file.
- Submit the .zip file on Google Classroom within the deadline.
- Submission other than Google classroom (e.g. Email etc.) Will not be accepted.
- The student is solely responsible to check the final zip files for issues like corrupt file, virus in the file, mistakenly exe sent.
- If the instructor cannot download the file from Google classroom due to any reason it will lead to zero marks in the assignment.
- Deadline of assignment is **19th October 2023 11:59 PM.**
- Deadline to **submit** assignment is **20th October 2023 11:59 PM. (a whole one day for submission only).**
- Assignments submitted after the deadline will be marked DIRECT ZERO.
- You are supposed to submit your assignment on GOOGLE CLASSROOM (CLASSROOM TAB only, not lab).
- Correct and timely submission of the assignment is the responsibility of every student; hence no relaxation will be given to anyone.
- For timely completion of the assignment, start as early as possible.
- Plagiarism is not allowed. If found plagiarized, you will be awarded zero marks in all the assignments.
- Comments: Comment on your code properly. Write your name and roll number (as a block comment) at the beginning of the solution to each problem.
- You must do proper allocation and deallocation of the memory where necessary.
- All programs must be generic.
- For timely completion of the assignment, start as early as possible.
- Your code should be modular.
- Note: Follow the given instructions to the letter, failing to do so will result in a zero.