Certification Project

Overview

This project is designed to assess your understanding of the concepts discussed in this course. The project is divided into various problem statements. Each problem statement is a practical scenario. The objective of this project is to assess your logical thinking and implementation of solutions.

Consider that you are the system programmer in your organization. You are expected to think through the best probable solutions and apply them. While trying to apply the solutions, you will need to perform them yourselves and list the steps.

XYZ Company has recently got a project for transformation and display of bird observations between years 1997 to 2018. The input data is composed of two files

1. First file **birds.bin** is a binary file that contains id and bird name, structure of each entry in the file is as follows

ID	LEN	BIRD NAME
2 Bytes	1 Byte	LEN Bytes

2. Second file **observations.bin** is also a binary file that consists of entries for birds recorded for any day of the year, structure of each entry in the file is as follows

FREE	YEAR	MONTH	DAY	ID	NUMBER OBSERVED
12 bits	11 bits	4 bits	5 bits	16 bits	16 bits

In the memory block above, each entry contains a 64 bit unsigned value where:

a. First 12 bits are reserved

b. 11 bits denote year 1997 to 2018

b. 4 bits denote months 1 to 12

c. 5 bits denote day 1 to 31

d. 16 bits denote bird id

c. 16 bits denote number of birds seen

Problem Statement 1

The **observations.bin** file may contain IDs for whom there is no ID defined in the **birds.bin** file, such IDs should be excluded

Problem Statement 2

Design a menu system for choosing options as follows, selecting individual option should trigger the selected functionality.

1. Show Bird - List Bird Name identified by user supplied bird ID
2. Filter birds by keyword - List all birds for the supplied keyword appearing in bird name
3. Sightings by year - Filter birds by supplied year
4. Show Stats by year - Show bird stats by supplied year range
5. Show Year/Month Stats - Show bird stats by supplied year range and month
6. Delete Observations - Delete bird observations reported in the supplied bird id, year and month range
7. Stats by bird keyword - Search bird by supplied keyword and list the statistics one below the other
8. Exit

Problem Statement 3

Display list of birds seen in a given year supplied by the user

Problem Statement 4

Display a statistic that will show bird ID and Name as header and show number of sightings of the bird (year wise single entry on each line). Inputs for this option would be:

- Bird ID (e.g. 10)
- Start Year (e.g. 1988) default value 1997
- End Year (e.g. 2003) default value 2018

The code for this should check and validate date range

Problem Statement 5

Display a statistic that will show bird ID and Name as header and show number of sightings of the bird (month wise single entry on each line). Inputs for this option would be:

- Bird ID (e.g. 10)
- Start Year (e.g. 1988) default value 1997

- End Year (e.g. 2003) default value 2018
- Month (1-12) Required field

The code for this should check and validate date range

Problem Statement 6

Should have a feature of deleting a bird observation(s) when following inputs are supplied

- Bird ID (e.g. 10)
- Start Year (e.g. 1997) default value 1997
- End Year (e.g. 2012) default value 2018
- Start Month (1-12) default value 1
- End Month (1-12) default value 12

The code should check for valid year range and month range

Problem Statement 7

Search a bird by a full word appearing in bird name (e.g. "robin" in "indian blue robin"). If the bird is found, show year wise number of bird sightings in ascending order. If multiple birds are found, show the sightings one below the other

Note: The source code should be developed making use of dynamic memory allocations techniques

Deliverables:

- All source files properly named as per the functionality exposed
- Makefile