

Assignment 3

Binary File Reader
with
Bit Fields

Binary File Format – Extended From Hwk 2

The file “tracks2.dat” contains binary data where each record is 22 bytes long.
The fields in this binary data are as follows:

FIELD	Length in Bytes	Type
Latitude	4	Single precision float
Longitude	4	Single precision float
Altitude (in meters)	2	Signed integer
Name	5	5 characters – not necessarily null terminated. Unused characters are null.
Misc	1	See Next Slide
Time Reported	6	See Below

Misc Field

The Misc field is one byte in length and contains the following information:

FIELD	MOST SIGNIFICANT BIT	LEAST SIGNIFICANT BIT	VALUES
Id	1	0	0=unknown, 1=friend, 2=foe, 3=neutral
Category	3	2	0=ship, 1=ground vehicle, 2=airplane
Engaged	4	4	0=not engaged, 1=engaged
Reserved	7	5	Not used

Time Reported Field – 3 16-Bit Words

FIELD	MOST SIGNIFICANT BIT	LEAST SIGNIFICANT BIT	WORD	VALUES
Year	6	0	0	Since 2000. For example, 18 means 2018
Month	10	7	0	1-12
Day	15	11	0	1-31
Hour	4	0	1	0-23
Minute	10	5	1	0-59
Reserved	15	11	1	0
Second	5	0	2	0-60
Reserved	15	6	2	0

What To Do

- “tracks2.dat” is available in the ~tburger/class directory
- Your program is to read the provided data file and write the contents to standard output in a readable format.
- The information in the “Misc” and “TimeReported” fields are to be described **using bit fields**.
- The file contains several data records – you must read and print all of them.
- Submit your program along with the output from your program
- Assignment is due on **Monday October 3**

Threshold Requirements

- All records decoded properly – must match the provided results
- The structure must use bit fields – do not use shifts and masks
- Each record is to be read with a single read operation

Objective Requirements

- Reasonable names for variables
- Follow the style guide
- Properly handle all records in the file, regardless of the number of records.
- Submit on time

The Answers. Check Your Results!

lat:32 lon:-117 alt:100 name:ABLE id:friend cat:airplane reported:
2021/aug/10 13:59:58

lat:32.5 lon:-117.25 alt:200 name:BAKER id:foe cat:ground vehicle
reported: 2020/dec/31 23:59:59

lat:32.6 lon:-118 alt:0 name:CAT id:neutral cat:ship reported: 2021/sep/01
01:02:03

lat:33 lon:-120 alt:-10 name:DOWN id:foe cat:ship engaged reported:
2021/jan/31 12:30:00

lat:34 lon:-120 alt:20 name:X id:foe cat:ship engaged reported: 2021/jul/04
10:30:00