York University

Dept. of Computer Science and Engineering

CSE2031 Software Tools

Assignment 2

Due Nov. 13th 2008

Write an ANSI C program that maintains a small database in he form of a linked list. The program user interacts with the program by issuing commands and sending data. The program manages and stores the data and responds to the user commands (that could include displaying data).

The commands are as follows

- I to insert an element in the list
- D to display the list in a specific format
- S To show the details of a specific record
- Del to delete a record.

Each record consists of a student ID, student name, date of birth, status, and GPA. The specification for each field is as follows (as an input to the program).

ID student ID is a string of 8 digits (0-9) $d_7d_6d_5...d_1d_0$ such that $d_6+d_2=7 \mod 10$. [(d2+d6) mod10 = 7] The ID is terminated by a tab

Name, name is on the form last name, comma, space, and first name. The maximum size of the string is 20 characters (including the comma and spaces. The record ends with a tab.

Date of birth is on the form dd mm yyyy where d,m,y are digits (0-9) and represent day, month, and year respectively. There is exactly one space between dd, mm, and yyyy. The date field ends with a tab.

Status is a digit from 1 to 4 to indicate student status $(1^{st} \text{ year}, 2^{nd} \text{ year} \dots)$ also ends with a tab.

GPA is a floating point positive number less than or equal 4.0

The records should be stored in a linked list sorted by ID (ascending order). The commands are interpreted as follows. (**quotations are not part of the output**)

• I: on a line by itself indicates inserting a student's record. The following line should include the record as explained in the previous paragraph. The program checks for the validity of the record. In the case of a malformed record (Illegal ID, duplicated ID, name > 20 char, wrong date, status, or GPA), the program display the message "Malformed Record" followed by a new line character. If the record is O.K. the record is put in a node and inserted in the list. A message "Record inserted" followed by a new line character is displayed. The list should be maintained in an ascending order according to the student ID.

- D: displays the entire list in ascending ID order. The display is controlled by flags to D. the command is on the form D –s or D –f
 The s (short) flag, displays a short display with the student name, followed by 2 tabs, then the GPA followed by a new line. The next record is display on the next line. The f (full) flag, displays the complete record as follows: ID, 2 tabs, Name, 2 tabs, date of birth on the form dd/mm/yyyy, one tab, then the status, one tab, then GPA followed by a new line. The next record starts on the next line. In both cases, if the list is empty, display "Empty List" followed by a new line.
- S shows the record of one student. The format is S followed by ID. If the ID is not valid, the program displays the message "Illegal ID \n" (note the space after ID)if the ID is valid, then full (complete) record is displayed as in the previous case followed by a new line character. If that ID is not in the list, a message "No such record" followed by a new line is displayed.
- Del followed by ID will either delete that node, and output "Record Deleted" (no space after deleted) followed by a new line, or "No such record" followed by a new line.

• Finally, Q ends the program with a BYE followed directly by a newline Hint: the specifier to output an integer in n places left padded with 0 is %0nd (%03d) Example input and output. **Bold** indicates input, *Italic* indicates output

12345578	McCormick,	John 12 11	1974	2	3.42		
Record inserte	ed						
I 10045(50)	D I I	01 10 1007	•	2 40			
12345678	Doe, John	01 12 1986	3	3.40			
Malformed Re	cord						
Ι							
10234778	Doe, Jane	03 06 1986	1	2.97			
Record inserte	ed						
D –s							
Doe, Jane	2.97						
McCormick, J	ohn	3.42					
Ι							
80567760	Einstein, Alb	ert 06 08	1932	4	4.00		
Record inserted							
Del 12345578							
Record Delete	d						
D –f							
10234778	Doe. J	ane	03/06/	1986	1	2.97	
80567760	Einster	in Alhert	00,00,	06/08/	1932	4	4 00
0	Linsie			00,00,	1752	,	1.00
X RVF							
DIL							

Submission: submit it as a2.c in a2