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| --- | --- | --- | --- |
|  | Test | Outcome | Result |
| **Program execution** | | | |
| 1 | input "./out " into command line | Program executes, read file and then menu options are displayed | ----------------------------  ========MENU OPTIONS========  ----------------------------  Enter 1 to add new record |  Enter 2 to modify a record |  Enter 3 to print a record |  Enter 4 to print all |  Enter 5 to delete record |  Enter 6 to Quit |  ---------------------------- |
| 2 | input "./out debug" into command line | Program executes in debug mode, Debug text for program and functions are displayed throughout | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Entered debug Mode  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 3 | input "./out x" into command line, where x is anything but the word debug | Error message displayed stating that that command is not found | ERROR: command X not found |
| **Input checks and Add function** | | | |
| 4 | at menu enter 1 | "prompt user to enter account number" | Enter account # |
| 5 | enters character and number combination for account Number | Error message displayed prompts user to enter an integer value | Enter account #  adf123  ERROR: Enter an integer value |
| 6 | enters number greater than an interger value | Error message displayed prompts user to enter an integer value | ERROR: Enter an integer value |
| 7 | enters integer value for account number | integer is stored in the account number of local variable, and prompts user to enter the name on the account | Enter the name on the account |
| 8 | enters any char of length greater than 25 | returns a message warning the user that only the first 25 chars were input into name field of local variable, and prompts the user to enter their address | Note! Number of characters exceeded.  Only the first 25 char were taken |
| 9 | enters any char of length less than or equal to 25 | char string input into name field of local variable, and prompts the user to enter their address | Enter address |
| 10 | enters any char of length less than or equal to 80 and hits enter twice | char string input into address field local variable, prompts user to enter birth year | Enter address  this is the  address less than  23  Enter year of birth (eg. 1990) |
| 11 | enters any char of length greater than to 80 and hits enter twice | Warning message informs user that the first 80 char were taken, char string input into address field local variable, prompts user to enter birth year | Enter address  thiss address is going to be greater than  the charachter length  it needs to be longer than 80 characters  Note! Number of characters exceeded.  Only the first 78 char were taken  Enter year of birth (eg. 1990) |
| 12 | enters birth year less than 1900 or greater than 2016 | error message, prompts user to reenter a birth date | Enter year of birth (eg. 1990)  1880  Error: Please enter a year between 1900 and 2016 |
| 13 | enters birth year withi 1900 - 2016 | inputs birthdate into a local variable, addRecord is the called, prompts memu | ----------------------------  ========MENU OPTIONS========  ----------------------------  Enter 1 to add new record |  Enter 2 to modify a record |  Enter 3 to print a record |  Enter 4 to print all |  Enter 5 to delete record |  Enter 6 to Quit |  ---------------------------- |
| 14 | local variable passed into arguments of addfunction: addRecord (struct record \*\* start, int accountno, char name[ ],char address[ ],int birthday) | new record will be created, space will be allocated in the heap, values passed in the aguments are stored in appropirate fields of the newly created struct account record whose address is at start | (struct record \*)malloc(sizeof(struct record)); |
| 15 | record being added to an empty list, start pointer pointing to null (add to empty list) | Fields are stored in new account at the new record address. Since start pointer points to NULL, the start pointer is assigned the value of the address of the new record. New record next field is set to null. Function exits and prompts user with menu options | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 2  name is Holly Day  address is 1000 School St.  Honolulu, HI 96823  birth year is 1990  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 16 | account number of new account less than the first account (add to front) | next field of new account set to address of current account and start pointer set to address of new account. Function exits and prompts user with menu options | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 2  name is Holly Day  address is 1000 School St.  Honolulu, HI 96823  birth year is 1990  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  /\*add to an empty list\*/  \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 1  name is Barb E. Dahl  address is 1415 Campus Rd.  Honolulu, HI 96824  USA  birth year is 1980  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 17 | account number of new account greater than the first and less than last acount account (insert) | new record next field set to address of next field of current record. Previous record next field set to address of new record. Function exits and prompts user with menu options | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 2  name is Holly Day  address is 1000 School St.  Honolulu, HI 96823  birth year is 1990  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  /\*add to an empty list\*/  \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 1  name is Barb E. Dahl  address is 1415 Campus Rd.  Honolulu, HI 96824  USA  birth year is 1980  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 3  name is Anita Knapp  address is 12 University Ave.  Honolulu, HI 96824  birth year is 1975  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 18 | account number of new account greater than last account (add to end) | next field of current record set to address of new record. Next field of new record set to NULL. Function exits and prompts user with menu options | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 1  name is Barb E. Dahl  address is 1415 Campus Rd.  Honolulu, HI 96824  USA  birth year is 1980  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 3  name is Anita Knapp  address is 12 University Ave.  Honolulu, HI 96824  birth year is 1975  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 4  name is aera  address is aegaegega gagaeg  aegaegaeg aa  gagaga  birth year is 1999  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 2  name is Holly Day2  address is 1000 School St.  Honolulu, HI 96823  birth year is 1990  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 19 | account number of new account equal to exsisting account (add duplicate) | new record next field set to address of next field of current record. Previous record next field set to address of new record. IF record is at the end, set next field of new record to NULL. Function exits and prompts user with menu options | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 2  name is Holly Day  address is 1000 School St.  Honolulu, HI 96823  birth year is 1990  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  /\*add to an empty list\*/  \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 1  name is Barb E. Dahl  address is 1415 Campus Rd.  Honolulu, HI 96824  USA  birth year is 1980  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 3  name is Anita Knapp  address is 12 University Ave.  Honolulu, HI 96824  birth year is 1975  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 4  name is aera  address is aegaegega gagaeg  aegaegaeg aa  gagaga  birth year is 1999  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Called function addRecord  Parameters passed:  struct record is ffbffb2c  account number is 2  name is Holly Day2  address is 1000 School St.  Honolulu, HI 96823  birth year is 1990  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| **Modify Record** | | | |
| 20 | at menu enter 2 | user prompted to enter account number and name to modify | 2  Enter account # |
| 21 | Assuming all input checks, Modify record is called: modifyRecord (start, accountnum, address); | starting at the address of start pointer, account numbers fields are compared to the account number passed. | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Function called: modifyRecord  Parameters passed:  record is 253f8  accountno is 1  name is lam  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 22 | passed an existing account number to modify record | upon match, address field of the record at the "current" pointer is changed to the argument passed as the address, exits and prompts menu option | Modify Record  Enter new name for the account |
| 23 | passed account number to modify record that does not exists | Return message that account does not exist | Enter account #  9  Modify Record  Enter new name for the account  fa  Account was not found  No account was modified |
| Print a record | | | |
| 24 | at menu 3 is entered | Prompts user to enter an account number | 3  Enter account # |
| 25 | assuming all input checks, printRecord (start, accountnum); | starting at the address of start pointer, account numbers fields are compared to the account number passed. | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Function called: printRecord  Parameters passed:  record is 253f8  accountno is 1  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 26 | upon a match to account number | all fields of the record at the address whose account number field matches the passed in value are printed to console. Exits and prompts menu options | Printing records matching account number 1  1  Barb E. Dahl  1415 Campus Rd.  Honolulu, HI 96824  USA  1980 |
| 27 | passed account number to print record that does not exists | Return message that account does not exist | 3  Enter account #  9  Record to print is not contained in database  ---------------------------- |
| Print all | | | |
| 28 | at menu 4 is entered | Prompts user to enter an account number | 4  Printing all records  1  Barb E. Dahl  1415 Campus Rd.  Honolulu, HI 96824  USA  1980  2  Holly Day2  1000 School St.  Honolulu, HI 96823  1990  2  Holly Day  1000 School St.  Honolulu, HI 96823  1990  3  Anita Knapp  12 University Ave.  Honolulu, HI 96824  1975  4  aera  aegaegega gagaeg  aegaegaeg aa  gagaga  1999 |
| 29 | assuming all input checks, print record is called: printAllRecords(start) | starting at the address of start pointer, all fields of of the record at the current address are printed to the console, pointer moved to the address stored in next field. This continues to print untill next field is NULL. Function exits and prompts menu options | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Function called: printAllRecords  Parameters passed:  record is 253f8  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| Delete Record | | | |
| 30 | at menu 5 is entered | Prompts user to enter an account number | 5  Enter account # |
| 31 | assuming all input checks | deleteRecord(&start, accountnum); is called and local variables a passed to appropriate arguments, | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Function called: deletRecord  Parameters passed:  record is ffbffb4c  accountno is 1  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 32 | account number matches first account (delete at start) | current record address copied to delete. Current address next field copied to start. Record at address stored in delete is freed,  account numbers ranging from 1 to 4, delete 1 | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Function called: deletRecord  Parameters passed:  record is ffbffb4c  accountno is 1  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 33 | account number matches account in the middle (delete at middle) | current record address copied to delete. Current address next field copied to previous address next field. Record at address stored in delete is freed,  account numbers ranging from 2 to 4, delete 3 | 3  \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Function called: deletRecord  Parameters passed:  record is ffbffb4c  accountno is 3  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 34 | account number matches last account (delete at end) | current record address copied to delete. Current address next field set to NULL. Record at address stored in delete is freed,  account numbers 2,2,& 4, delete 4 | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Function called: deletRecord  Parameters passed:  record is ffbffb4c  accountno is 4  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 35 | Delete duplicates | deletions are handled on a record by record basis. Function exits when current record is null. If another record matches the account number it will be deleted base off of one of the three previous methods above,  account numbers 2,2, delete 2 | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  Function called: deletRecord  Parameters passed:  record is ffbffb4c  accountno is 2  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| **End Program** | | | |
| 36 | entered 6 at menu | write file called | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  DEBUG: calling function writefile  parameters passed  struct record is ffbffc54  filename is in sorted.txt  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| **Write** | | | |
| 37 | file name passed to write file does not exist (create new file) | New text file created names the name passed into the agument. Starting at the address of the start pointer and write all fields of each record to the file until current record is NULL, Add a '!' to the end of address and \n to all fields | \*\*\*\*\*\*\*\*DEBUG MODE\*\*\*\*\*\*\*\*  DEBUG: calling function writefile  parameters passed  struct record is ffbffc54  filename is in sorted.txt  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| 38 | file name passed to write file exist (append to existing file) | Locate file. Starting at the address of the start pointer and write all fields of each record to the file until current record is NULL to the end of existing records, Add a '!' to the end of address and \n to all fields | 1  Barb E. Dahl  1415 Campus Rd.  Honolulu, HI 96824  USA!  1980 |
| **Read** | | | |
| 39 | name of text file doesn’t match (file doesn’t exists) | return message that file does not exist, call menu options | File does not exists to read |
| 40 | name of text file matches but file empty (file exists) | file will be read but no new records will be created, call to menu option after exit | Proved by printing below:  ----------------------------  ========MENU OPTIONS========  ----------------------------  Enter 1 to add new record |  Enter 2 to modify a record |  Enter 3 to print a record |  Enter 4 to print all |  Enter 5 to delete record |  Enter 6 to Quit |  ----------------------------  4  List contains no records |
| 41 | name of text file matches and contains records (file exists) | file read, contents stored in approriate local variables, addrecord called and appropriate arguments are passed in. call to menu option after exit | 4  Printing all records  1  Barb E. Dahl  1415 Campus Rd.  Honolulu, HI 96824  USA  1980  2  Holly Day2  1000 School St.  Honolulu, HI 96823  1990  2  Holly Day  1000 School St.  Honolulu, HI 96823  1990  3  Anita Knapp  12 University Ave.  Honolulu, HI 96824  1975  4  aera  aegaegega gagaeg  aegaegaeg aa  gagaga  1999 |
| 42 |  |  |  |