Unix
C + GNU
HTML
Perl
Python

Software Systems

Week 13

About the Final Exam

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Announcements

- Final exam tutorials
  - Will be posted on myCourses
- Sample final
  - Will be posted on myCourses
- Course evaluations
- Exam office hours
  - Tuesday and Wednesday at 3PM
  - Or, by appointment

About Final Exam

- 3 hours
  - Monday, December 18; 6:30-9:30pm
- Structure:
  - About 8 problems, no definitions
    - Command-line expressions
    - Bash programming X 1
    - GNU problems
    - C programming X 3

Type of questions

- Programming questions
- GNU case study problems

Topics on Exam

- C Programming
  - Pre-processor, struct, pointers, malloc, fork, fork & shell memory, fork & files, system, ~~linked lists~~, files, random files, extern, .h files, modular programming, functions, libraries, systems programming techniques, exit
- GNU Tools
  - Git, Make, GCC, GDB, GProf

How to Study

- Study:
  - Assignments, problems from textbook
  - Language syntax
  - Practice GNU Tools on Unix/Linux

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Questions?

Problems

- C: Delete all occurrences of WORD in file
- C: Modular program with private array of grades

  Display the average grade
- C: An array of bank accounts, checking and savings, using struct and union, with functions deposit and withdraw.
- C: Using fork( ) search an array, using linear search, twice as fast

Additional Problems

C

- Write the C program that can do this command line problem
  ./calc 5 + 4
  The above C program displays 9 on the screen
  Hint: atoi(), argv[]

- String manipulation in C. Assume a single string formatted using CSV (comma separated). It looks something like this: "a b c, d e f, g h i". You are given a word, f. Is this word in the line? Which csv part of the line?
  Hint: strstr(), loop with ptrs. Or: tokenizer and strstr().

- ./copy word filename1 filename2
  Copy every line from filename1 into filename2 except those lines that have word in it.

- GDB: learn subset of commands, enough to knows how to find an error.
- GPROF: learn how to read the summary and detail outputs

Answers


```
struct STUDENT
{
    char *name;
    char nameA[100];
    int age;
    double gpa;
} s2[200];

Struct STUDENT s1[200];

scanf("%d",&x);
S1.name = (char *) malloc(x*sizeof(char));

*(ptr).   === p->   (ptrs)
S1.  (structures)

Wrong:  scanf("%s",s1[5].name);
```

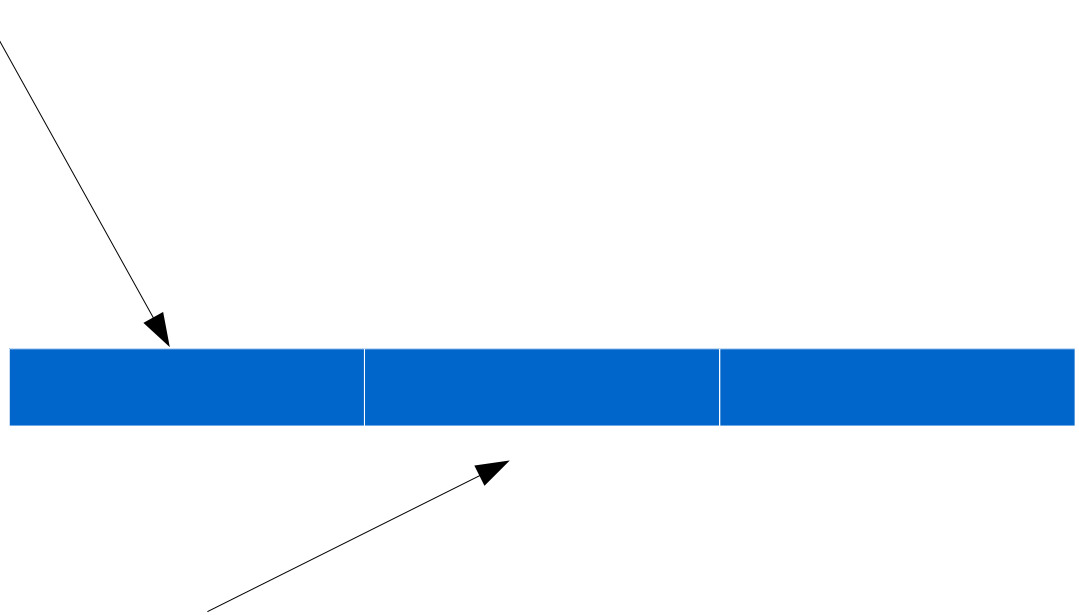

```
struct STUDENT
{
      char *name;
      char nameA[100];                p++
      int age;
      double gpa;
} s2[200];

Struct STUDENT s1[200], *p;

scanf("%d",&x);
p = (struct STUDENT *) malloc(x*sizeof(struct STUDENT));

P[3].age

*(p+3).age
```


```
struct STUDENT
{
      char *name;
      char nameA[100];
      int age;
      double gpa;
      Struct STUDENT *next;
} s2[200];
```

```
T = head;
T = t->next;

while(t != NULL && count<n)
{
      Count++;
      printf("%d", t->age);
      T = t->next;
}
```

```
Struct STUDENT s1[200], *head, *t; // t means temp

head = (struct STUDENT *) malloc(sizeof(struct STUDENT));

head->next = (struct STUDENT *) malloc(sizeof(struct STUDENT));
head->next->next = NULL;
```

P = malloc(3*sizeof(struct STUDENT));



Q = p + 1; /// p++


```
c=fgetc(p);
While(!feof(p))
{
      If (c=='.') count ++;
      c=fgetc(p);
}
```

```
int main(int argc, char *argv[])
{     int count = 0;
      FILE *p;   char a[500];
      If (argc != 2) exit(1);
      P = fopen(argv[1],"rt");
      If (p == NULL) exit(2);

      fgets(a,499,p);
      While(!feof(p))
      {
            //for(i=0;i<499&&a[i]!='.';i++);
            for(i=0;i<499&&a[i]!='\0';i++)
                  {
                        if(a[i]=='.') count++;
                  }
            fgets(a,499,p);
      }
}
```

Delete Word in File

```
char line[2000];
char *theWord=”bob”, *ptr, *ptr2;
FILE *inFile, *outFile;
inFile  = fopen(“infilename.txt”,”rt”);
OutFile = fopen(“outfilename.txt”,”wt”);
if(inFile==NULL || outFile==NULL) exit(0);

fgets(line,1999,inFile);  // get the first line
while(!feof(inFile))
{
    ptr = strstr(line,theWord);
    if (ptr != NULL) // found the substring
    {
        ptr2 = ptr + strlen(theWord); // past end of substring
        while(*ptr2!='\0') {*ptr = *ptr2; ptr++; ptr2++;}
            // we could have done: *ptr++ = *ptr2++; Crazy huh!
    }
    fputs(line,outFile);      // copy to new file
    fgets(line,1999,inFile);  // get next line
}
```

Private Array Module

```
int array[10];

void addValue(int x, int pos)
{
    if (pos >=0 && pos <10)
        array[pos] = x;
}
```

F1.c

```
void addValue(int, int);

// since we do not mention array
// as an extern it is private
```

F1.h

```
// we respect the programmer of F1 by
// not inserting our own extern declarations

#include "F1.h"

int main(void)
{
    addValue(5,9);
}
```

F2.c

Array of Bank Accounts

```
struct account
{
    int acctNo;
    double balance;
};

struct account bankAccounts[100];

BankAccounts[2].balance = 100.50;
```


```
struct savings
{
    Float balance;
}

struct check
{
}

union accountType
{
    struct savings x;
    struct checking y;
}

struct account
{
    char type;
    union accountType theAccount;
}

struct acccount array[100];

array[i].x.balance = 200.00;
```