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Université d'Ottawa · University of Ottawa

Faculté des sciences Informatique
Faculty of Science Computer Science

CSI 2131/Winter '97

Final Examination

Course Lecturer and Examiner: K. Kannemann

Date and Time: April 22, 1997; 1400h

Duration: Three (3) hours

Mode: Closed book; no calculators or any other memory device.

Total weight: 60 points = 60% of Final Grade

Point unit time interval: 180 mins/60 pts = 3.0 mins/pt

1 Name and describe the two (2) major categories of *external storage devices*, with regard to, (i) the applied *storage topology*, (ii) the *access methods* supported, and (iii) the typical *applications*. (3+3+3=9 points)

2 Modern file systems can be extended by *mounting external file systems*. Compare (i) for UNIX and DOS how a *mounted file system* extends the *topological structure* of the respective file system; stating (ii) a possible constraint. (2+2=4 points)

3 Explain (i) and contrast the notion of *regular file*, then (ii) name and describe the two (2) major subcategories of *regular files* with regard to *contents* and *structure*. (3+3=6 points)

4 Name and describe the two (2) *generic levels of procedural file management* supported by DOS and UNIX, with regard to, (i) *basic characteristics and capabilities*, (ii) *scope and application*, and (iii) *portability and standards*. (3+3+3=6 points)

5 Consider this fragment of a *file copy program*,

```
#include <stdio.h> …
main(int argc, char *argv[]) {
FILE *inf, *outf;
char c; …
… inf = fopen(argv[1], "r") …
… outf = fopen(argv[2], "w") …
… while((c = getc(inf)) != EOF) putc(c, outf );
…
```

which worked ***fine with text files***, but ever so often ***failed*** *to completely copy binary* files. Please (i) explain the *reason*, and (ii) suggest a possible *remedy*. (3+3=6 points)

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Final Examination — cont'd

6 State and briefly explain the reasons why an *open file* should be *closed* as soon as possible within a process. (3 points)

7 Explain (i) the difference between *index-sequential access* and *random access*, and (ii) briefly describe[1] how this was implemented in your project. (4+4=8 points)

8 The index structure you used in your project contains an *encoded date component* as secondary key,

```
struct INDX {
        ...
        unsigned long mdate;
        ...
        };
```

Explain[1] (i) how the *key data was encoded*, how (ii) you would implement a *binary search* on this key; then (iii) correctly *name* and briefly *describe* the requisite *library functions*. (4+4+4=12 points)

9 If you were to describe your lab project to an interested party (e.g. a potential employer), one of the first return questions would likely relate to, (i) the *type of hardware platform* you have actually worked with; (ii) the **OEM** version and the *current release* of the *resident operating system* on that platform; and (iii) the *native programming tools* you have actually used to accomplish your work. Please oblige. (2+2+2=6 points)

1. Or sketch using C or pseudo-code