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C Questions

1.) The two programs have different conditions in their for loops:

In the first program: for ($i = 1, j = 1; i \leq 5, j \leq 100; i++, j++$)

In the second program: for ($i = 1, j = 1; j \leq 100, i \leq 5; i++, j++$)

The comma operator in C evaluates both expressions but returns the value of the second expression. Therefore:

In the first program, the loop continues as long as $j \leq 100$.

In the second program, the loop continues as long as $i \leq 5$.

This results in different numbers of iterations and thus different outputs.

2.) In standard C, there is no built-in function to get the cursor position. However, on some systems, you can use platform-specific functions or libraries like ncurses on Unix-like

systems.

3.) There is no standard way to delete lines in a text window in C. You would typically use platform-specific functions or libraries like ncurses for terminal manipulation.

4.) You can use the `clock()` function from the `time.h` library to measure the time elapsed between two function calls:

```
# include <time.h>
clock_t start, end;
double cpu_time_used;

start = clock();
// Function call
end = clock();
cpu_time_used = ((double) (end - start)) /
CLOCKS_PER_SEC;
```

5.) The `swab()` function swaps adjacent bytes. Here's an example:

```
# include
```

```
<stdlib.h>
```

```
# include <stdio.h>
```

```
int main() {
    char from[] = "1234";
    char to[4];
    swab(from, to, strlen(from));
    printf("Swapped: %s\n", to);
    return 0;
}
```

C++ Questions

1.) Output of the Program

The program will output:

The size of the user class.

The size of an instance of the user class.

The values of i, f, and c (which will be uninitialized and thus garbage values).

The sizeof(user) will depend on the size of its members and padding. The displaydata() function will print uninitialized values.

2.) # include <iostream>

using namespace

```
std;
```

```
int main() {  
    int a = 10;  
    int *p = &a;
```

Convert pointer to integer

```
intptr_t ptr_as_int = reinterpret_cast(p);  
cout << "Pointer as integer: " << ptr_as_int <<  
endl;
```

Convert integer back to pointer

```
int *p2 = reinterpret_cast(ptr_as_int);  
cout << "Integer as pointer: " << *p2 << endl;
```

```
return 0;  
}
```

This program demonstrates how to convert a pointer to an integer and back using `reinterpret_cast`. Note that this is generally unsafe and should be used with caution.

Data Structures

1.) B-trees and B+ trees are commonly used in RDBMS

for internal storage representation. They are efficient for disk storage and support efficient insertion, deletion, and search operations.

2.) Inserting the sequence 92, 24, 6, 7, 11, 8, 22, 4, 5, 16, 19, 20, 78 into a B-tree of order 3 will result in a tree structure where each node can have at most 2 keys and 3 children. The exact structure will depend on the insertion order and splitting rules.

UNnix

1.) Executing a process in the background allows you to continue using the terminal for other tasks while the process runs independently.

2.) You can use system calls like fork() and exec() in Unix to execute one program from within another. For example:

```
# include <unistd.h>
# include <stdio.h>
```

```
int main() {
if (fork() == 0) {
```

```
execvp("ls", "ls", NULL);
}
return 0;
}
```

DBMS

1.) Features of SQL:

Data Definition Language (DDL): Commands like CREATE, ALTER, DROP.

Data manipulation Language (DmL): Commands like SELECT, INSERT, UPDATE, DELETE.

Data Control Language (DCL): Commands like GRANT, REVOKE.

Transaction Control: Commands like COMMIT, ROLLBACK.

2.) SQL organizes data in tables (relations) which consist of rows (tuples) and columns (attributes).

Tables can be related to each other using keys (primary and foreign keys).

Operating Systems

1.) Load-time vs Run-time Dynamic

Linking:

Load-time dynamic linking: Libraries are linked when the program is loaded into memory.

Run-time dynamic linking: Libraries are linked during the execution of the program, allowing for more flexibility and potentially reducing memory usage.

2.) Demand- and Pre-paging:

Demand paging: Pages are loaded into memory only when they are needed.

Pre-paging: Pages are loaded into memory in advance, anticipating that they will be needed soon.

SQL

1.) DESC is used to sort the result set in descending order. For example:

```
SELECT * FROM table_name ORDER BY column_name  
DESC;
```

2.) CASCADE CONSTRAINTS is used in DDL statements to automatically drop dependent constraints when a

table is dropped.

3.) i) SELECT * FROM PROGRAMMER WHERE PROF1 = 'C'
OR PROF2 = 'C';

ii) SELECT COUNT(*) FROM PROGRAMMER WHERE
PROF1 IN ('C', 'Pascal') OR PROF2 IN ('C', 'Pascal');

Computer Networks

1.) An IPv4 address is a 32-bit address used to identify devices on a network. It is divided into five classes:

Class A: 0.0.0.0 to 127.255.255.255 (Supports large networks)

Class B: 128.0.0.0 to 191.255.255.255 (Supports medium-sized networks)

Class C: 192.0.0.0 to 223.255.255.255 (Supports small networks)

Class D: 224.0.0.0 to 239.255.255.255
(Reserved for multicast)

Class E: 240.0.0.0 to 255.255.255.255
(Reserved for experimental use)