- CPSC 275: Introduction to Computer Systems

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Fall 2025

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Homework 22

NOTE: You are not required to hand in the following exercises, but you are strongly encouraged to complete them to strengthen your understanding of the concepts covered in class.

1. For each of the following structure declarations, determine the offset of each field, the total size of the structure, and its alignment requirement under Linux/IA32.
    - A. `struct P1 { int i; char c; int j; char d; };`
    - B. `struct P2 { int i; char c; char d; int j; };`
    - C. `struct P3 { short w[3]; char c[3] };`
    - D. `struct P4 { short w[3]; char *c[3] };`
    - E. `struct P3 { struct P1 a[2]; struct P2 *p };`

2. Consider the following structure declaration:

```
struct {
    char *a;
    short b;
    double c;
    char d;
    float e;
    char f;
    long long g; // 8 bytes on Windows
    void *h;
} foo;
```

Suppose it was compiled on a Windows machine, where each primitive data type of K bytes must have an offset that is a multiple of K.

    - A. What are the byte offsets of all the fields in the structure?
    - B. What is the total size of the structure?
    - C. Rearrange the fields of the structure to minimize wasted space, and then show the byte offsets and total size for the rearranged structure.

- **Welcome: Sean**

    - LogOut