

CSE 304 2. Midterm Exam (a)

I. QUESTION

In the programming language Odja, higher dimensional arrays (> 1) are stored in column-major order. Given the following declaration of the array

$$\text{char } a[l_1 \dots h_1][l_2 \dots h_2] \quad (1)$$

and the base address of a is b , what is the address of the element $a[i][j]$?

- b) main is calling fn1, fn1 is calling fn3
- c) main is calling fn2, fn2 is calling fn3 , fn3 is calling fn1
- d) main is calling fn3, fn3 is calling fn1
- e) main is calling fn1, fn1 is calling fn3 , fn3 is calling fn2
- f) main is calling fn3, fn3 is calling fn2 , fn2 is calling fn1

II. QUESTION

Give two code segments in C language where there is

- i. the dangling pointer problem
- ii. the lost heap-dynamic variables problem.

Show how you can remove those problems by adding or removing some statements.

III. QUESTION

We have the following C program:

```

void fn1 (void);
void fn2 (void);
void fn3 (void);
void main() {
    int a,b,c;
    ...
}
void fn1(void) {
    int b,c,d;
    ...
}
void fn2(void) {
    int c,d,e;
    ...
}
void fn3(void) {
    int d,e,f;
    ...
}

```

Assume that this is a dynamic scoping language. In each of the following calling sequences, show which variables are visible at the time the last called function is executing. For each variable, state both the name of the variable and in which function it was defined.

- a) main is calling fn1, fn1 is calling fn2 , fn2 is calling fn3