

Homework 4

Due: May 17, 2012 in class

- 1 (25%) The following code finds the first row of an n by n integer matrix called x that has zero in all its elements.

```
for (i = 0; i < n; i++) {
    for (j = 0; j < n; j++)
        if (x[i][j] != 0) goto reject;
    printf("First all-zero row is:\n", i);
    break;
reject:
}
```

(a) Rewrite this code without goto. (b) Compare the efficiency of your code to that of the example code in terms of the expected number of iterations executed.

- 2 (20%) Consider the following C program segment. Rewrite it using no gotos or breaks.

```
j = -3;
for (i = 1; i < 3; i++) {
    switch(j + 2) {
        case 3:
        case 2: j--; break;
        case 0: j += 2; break;
        default: j = 0;
    }
    if (j > 0) break;
    j = 3 - i;
}
```

- 3 (15%) Consider the following C program:

```
void fun(int first, int second) {
    first += first;
    second += second;
}

void main() {
    int list[2] = {1, 3};
    fun(list[0], list[1]);
}
```

For each of the following parameter-passing methods, what are the values of the `list` array after execution?

- (a) pass by value

(b) pass by reference

(c) pass by value-result

- 4 (40%) In the following program segment, the function `print_addr()` will find the memory address of the function `show()`.

```
void show() {  
    printf("\n\nFunction called!");  
}
```

```
void print_addr() {  
    printf("Address of show(): %u", show);  
}
```

- (a) Rewrite `print_addr()` to print the address of any function given as a parameter. (b) Test and show whether the reference environment of the passed subprogram is shallow binding, deep binding, or ad hoc binding in C. You have to show how you make the tests.