

# CS31 Written Homework 4: C Pointers      Name:

Due Thurs, Oct 12 in class

## Question 1

Consider the following declarations and assignments:

```
int *a, b[5], c, *d;

for (c=0; c < 5 ; c++) {
    b[c]= 1+c;
}
d=b;
a = &c;
c = d[3];
```

What are the TYPE and VALUE of each of the following expressions (if the expression is invalid, write “Illegal Expression”, and if it is an address describe what it is the address of):

	TYPE	VALUE
1.    a	-----	-----
2.    b	-----	-----
3.    c	-----	-----
4.    &b[1]	-----	-----
5.    d	-----	-----
6.    *d	-----	-----

## Question 2

Trace through the following C code, and draw memory contents (heap and stack) at the execution point indicated in `foo`, and show the output produced by a complete run of the program. (Assume `stdio.h` and `stdlib.h` have been included, and that `malloc` succeeds.)

MEMORY

-----

```
int *foo(int *a, int *b, int s);

void main () {
    int *arr = NULL, x = 6, y = 7, i;

    arr = foo(&x, &y, 5);
    printf("x = %d y = %d\n", x, y);
    if(arr != NULL) {
        for(i=0; i < 5; i++) {
            printf("arr[%d] = %d\n",
                i, arr[i]);
        }
    }
    free(arr);
}

/*****/
int *foo(int *a, int *b, int s) {
    int *tmp, i;

    tmp = malloc(sizeof(int)*s);
    if(tmp != NULL) {
        for(i=0; i < s; i++) {
            tmp[i] = i + *b;
        }
        *a = tmp[2];
        *b = 8;
    }
    // DRAW MEMORY WHEN YOU GET HERE
    return tmp;
}
```

OUTPUT

-----