

CS 31 Homework 4: C Pointers
Due at the start of class Thursday, Oct. 7 2021

Names and Roles:

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);

int 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);
    return 0;
}

/*****/
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
