

CS 31 Homework 4: C Pointers

Due at the start of class **Tuesday**, March 1, 2021

Names and Lab Sections:

Question 1

Consider the following declarations and assignments:

```
int a, *b, *c, d[4];
for (a = 0; a < 4 ; a++) {
    d[a] = 1 + a;
}
b = d;
c = &a;
a = b[3];
```

Describe the TYPE and VALUE of each of the expressions below. If the expression is an address, describe what it is the address of. If it is invalid, write “Illegal Expression”.

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

Question 2

Trace through the following C code, and draw memory contents (heap and stack) at the execution point indicated in `func`, 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 *func(int *a, int *b, int s);

int main () {
    int *arr = NULL, x = 4, y = 3, i;

    arr = func(&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 *func(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
