1. Consider the following 2D array in C:

   ```c
   int A[M][N];
   ```

   a. We’d like to work with column 1 of the array, i.e., the data in A[0][1], A[1][1], A[2][1], etc. In particular, we want an int * that refers to a 1D array containing this column. Can this be done by setting such a pointer to point to the column’s first element, or must we copy the elements of the column into a separate 1D array?

   b. We’d now like to work with row 1 of the array, i.e., the data in A[1][0], A[1][1], A[1][2], etc. In particular, we want an int * that refers to a 1D array containing this row. Can this be done by setting such a pointer to point to the row’s first element, or must we copy the elements of the row into a separate 1D array?

2. We want a (3D) array of the 2D arrays of problem 1, i.e., we’d like to organize P MxN arrays as a single PxMxN array.

   a. How does one declare an array of P of the 2D arrays of problem 1?

   b. We would like a pointer ptr that refers to a 2D array (of problem 1), so that we can use it to iterate through the array of such 2D arrays. How would one declare such a pointer? (It’s definitely not cheating to test your answer using gcc!)

   c. We would like a function func that takes an int as an argument and returns a pointer to our 2D array. How would one declare such a function?

3. What’s wrong, if anything, with each of the following?

   a. ```c
   int proc(int m) {
       static int array[m];
       // ...
   }
   ```

   b. ```c
   int *array;
   
   void init(void) {
       int A[20];
       array = A;
   }
   ```

   ```c
   int main(void) {
   ```
init();
array[7] = 6;
// ...
}

c.
struct array_struct {
  int array[20];
};

struct array_struct init(void) {
  struct array_struct a_s;
  for (int i=0; i<20; i++)
    a_s.array[i] = i;
  return a_s;
}

int main(void) {
  struct array_struct x = init();
  // ...
}

d.
int main(int argc, char *argv[]) {
  int a=0, b=0;
  int c;

  if (argc != 3) {
    fprintf(stderr, "Wrong number of args\n");
    exit(1);
  }
  a = atoi(argv[1]);
  b = atoi(argv[2]);
  switch(a) {
  case 0:
    c=b;
    break;
  case 1:
    a=b;
    break;
  default:
    c=a;
  }
  return a+b+c;
}