

Name: _____

Date: _____

Question:	1	2	3	4	Total
Points:	20	25	5	5	55
Score:					

Programming.

1. The following program prints some data of anonymous research subjects.

```
1  #include <stdio.h>
2
3  struct Anonymous
4  {
5      int id;                // record No.
6      int age;               // in years
7      int height;            // in centimeters
8      int weight;            // in kilograms
9  };
10
11 void data_print (struct Anonymous *who);
12
13 void data_print (struct Anonymous *who)
14 {
15     printf ("\tID:      %3d\n", who->id);
16     printf ("\tAge:     %3d years\n", who->age);
17     printf ("\tHeight:  %3d centimeters\n", who->height);
18     printf ("\tWeight:  %3d kilograms \n\n", who->weight);
19 }
20
21 int main (void)
22 {
23     // initialize two subjects
24     struct Anonymous doe1 = { 1, 32, 164, 60 };
25     struct Anonymous doe2 = { 2, 19, 172, 80 };
26
27     // print them out
28     data_print (&doe1);
29     data_print (&doe2);
30
31     // make everyone age 20, taller, and heavier and print
    them again
```

```
32     doe1.age = 20;
33     doe1.height += 2;
34     doe1.weight += 10;
35     data_print (&doe1);
36
37     doe2.age = 20;
38     doe2.height += 1;
39     doe2.weight += 1;
40     data_print (&doe2);
41
42     return 0;
43 }
```

Describe briefly what is the output of the program.

(a) (2 points) How many text lines (including empty lines, if any) is printed:

(b) (8 points) What are the first four lines (including empty lines, if any) printed:

(c) (10 points) What are the last five lines printed (including empty lines, if any):

2. The following program initializes an array, manipulates its elements, and prints sums of some of the elements.

```
1  #include <stdio.h>
2
3  void swap1 (int a, int b);
4  void swap2 (int *a, int *b);
5
6  #define NDIM 5
7
```

```
8 void swap1 (int a, int b)
9 {
10     int t;
11
12     t = a;
13     a = b;
14     b = t;
15 }
16
17 void swap2 (int *a, int *b)
18 {
19     int t;
20
21     t = *a;
22     *a = *b;
23     *b = t;
24 }
25
26 int main (void)
27 {
28     int i, s1, s2;
29     int a[NDIM];
30
31     for (i = 0; i < NDIM; i++)
32     {
33         a[i] = i / 2;
34         printf ("%d ", a[i]);
35     }
36     printf ("\n");
37
38     swap1 (a[1], a[2]);
39     swap1 (a[3], a[4]);
40
41     for (i = 0; i < NDIM; i++)
42     {
43         printf ("%d ", a[i]);
44     }
45     printf ("\n");
46
47     swap2 (&(a[1]), &(a[2]));
48     swap2 (&(a[3]), &(a[4]));
49
50     for (i = 0; i < NDIM; i++)
51     {
52         printf ("%d ", a[i]);
```

```
53     }
54     printf ("\n");
55
56     s1 = 0;
57     s2 = 0;
58     for (i = 0; i < NDIM; i++)
59     {
60         s1 += a[i];
61         if ((i < 2) || (i > 3))
62         {
63             s2 += a[i];
64         }
65     }
66     printf ("%d      %d\n", s1, s2);
67
68     return 0;
69 }
```

The program prints four lines. Describe briefly what is the output of the program.

(a) (5 points) Line 1:

(b) (5 points) Line 2:

(c) (5 points) Line 3:

(d) (10 points) Line 4:

Multiple choice questions.

For each of the following questions or statements, circle the letter corresponding to one response that best answers the question or completes the statement.

3. (5 points) Which of the following is *not* a keyword in C?

- A. while
- B. else
- C. void
- D. character

4. (5 points) Which of the following commands will list the content of a subdirectory `data` in your current working directory?

- A. `cd /data`
- B. `cd data/`
- C. `rm data/`
- D. `rm /data`
- E. `ls data/`
- F. `ls /data`