Answer the questions in the spaces provided on the question sheets. If you need more space for your answer, continue on the back of the page. Answer the questions without compiling and runing the codes in questions on a computer.

Name: _____

Date: _____

Question:	1	2	3	Total
Points:	15	10	10	35
Score:				

1. Describe exactly but briefly what is the output of the program.

```
#include <stdio.h>

double fun (double x, double y[]);

int main (void)
{
    double x, y[5];
    int i;
    x = 2.;
    for(i = 0; i < 5; i++)
    {
        y[i] = x*i;
    }
    printf ("main 1: %f  %f\n", x, y[4]);
    x = fun(x, y);
    printf ("main 2: %f  %f\n", x, y[4]);

    return 0;
}

double fun (double x, double y[])
{
    y[4] *= 2;
    printf ("fun:    %f  %f\n", x, y[4]);
    return y[0] + y[1] + y[2];
}
```

(a) (5 points) The first printf statement in the main program:

(b) (5 points) The printf statement in the function fun:

(c) (5 points) The second printf statement in the main program:

2. The function below is supposed to return 1 if n equals 0 but it always returns 0.

   (a) (5 points) Why?

   (b) (5 points) Fix it such that the originally intended purpose is restored. (Use a red pen to indicate the changes in the code.)

```
1  int f (int n)
2  {
3      if (n = 0)
4      {
5          return(1);
6      }
7      else
8      {
9          return(0);
10     }
11 }
```

3. The Fibonacci numbers is the series 0, 1, 1, 2, 3, 5, 8, 13, ... where the next number is found by adding up the two numbers before it:

$$F_n = F_{n-1} + F_{n-2}, \quad n = 2, 3, 4, \ldots \quad F_0 = 0, \quad F_1 = 1,$$

   The program below is supposed to calculate Fibonacci numbers $F_2, \ldots, F_9$ and print only F_4, F_5, and F_6 but it doesn't do it completely right.

   (a) (5 points) Describe exactly but briefly what is the output of the program:

   (b) (5 points) Fix it such that the originally intended output is produced. (Use a red pen to indicate the changes in the code.)

```
1  #include <stdio.h>
2
3  #define N 10
```

```
4
5  int main (void)
6  {
7      int i, j, k;
8      int p;
9
10     k = 0;  /* F[0] */
11     j = 1;  /* F[1] */
12
13     for(p = 2; p < N; p++)
14     {
15         i = j + k;       /* F[n] = F[n-1] + F[n-2] */
16         if ( (p > 3) || (p < 7) )
17         {
18             printf("  F[%d] = %5d\n", p, i);
19         }
20         k = j;
21         j = i;
22     }
23
24     return 0;
25 }
```