CS111 Introduction to Computers

Programming Sheet 5

(Arrays)

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1. Given an array X with the following values, and variable i = 3:

X[0]	X[1]	X[2]	X[3]	X[4]	X[5]	X[6]	X[7]
10.0	15.0	6.0	5.0	20.0	0.0	1.5	2.5

   Find the value of y in each of the following expressions:

   a. y = X[i] + 1
   b. y = X[i+1]
   c. y = X[i/2]
   d. y = X[i]/2
   e. y = X[i*2]

2. Trace the following program:

```
#include<stdio.h>
void main()
{
  int n, i, j, t, a[10];

  for (i = 0; i < 7; i++)
        a[i] = i;

  for (i =6; i>3; i--)
    {
        j = i-1;
        while(j > 2)
          {
                t = a[i-j];
                a[i-j] = a[7-i+j];
                a[7-i+j] = t;
                j--;
          }
    }

  for (i = 0; i<7; i++)
        printf("%d", a[i]);
}
```

3. Trace the following program for the input list (5 9 3 2 17 6 1 9 10):

```
#include<stdio.h>
void main()
{
  int n, i, j, t, x[3][3];

  for (i = 0; i < 3; i++)
        for (j = 0; j < 3; j++)
                scanf("%d", &x[i][j]);

  for (i = 0; i < 3; i++)
        for (j = 0; j < 3; j++)
                if (x[i][j] < 5)
                        x[i][j] = 2*x[i][j]-1;
                else x[i][j] = (x[i][j]/2)+2;

  for (i = 0; i < 3; i++)
    {
        for (j = 0; j < 3; j++)
                printf("%d", x[i][j]);

        printf("\n");
    }

}
```

4. Trace the following part of the program for the input array:

x	10	8	6	20	9	4	15	3	7

```
int p = 1, i;
for(i = 0; i < 10; i++)
        if(x[i] < x[p])
                p = i;
printf("\n%d", x[p]);
```

5. Write a program that reads 10 numbers in a one-dimensional array and computes their average, minimum, and maximum. Use functions for the required tasks.

6. Write a program that reads 10 numbers in a one-dimensional array and calculates the sum of the array elements with an odd index and the sum of the array elements with and even index. Use functions.

7. Write a program to read the scores of 3 tests for N students. For each student, calculate and print the average score of the 3 tests and assign a letter grade based on that average, then find the number of students that acquire each grade. (Use arrays and functions in your solution).

Numeric Grade	**Letter Grade**
90-100	A
80-89	B
70-79	C
60-69	D
0-50	F