

Seat Number

KING MONGKUT's UNIVERSITY OF TECHNOLOGY THONBURI

Computer Engineering Department

Final Examination, First Semester 2017

November 30, 2017

13:00-16:00

CPE 100 Computer Programming for Engineers.

Environmental Engineering Students(Inter.)

Km 20/12/2017

Instructions

1. This is a closed book exam.
2. There are totally 2 parts in 9 pages with totally 50 points.
3. The answers must be written in the space and blank space provided.
4. Any electronic device is not allowed.
5. Please read every question carefully before answer it.
6. Please write your name and your student number on every page.

Asst. Prof. Sanan Srakaew

This examination has been approved by the Department of computer engineering.

Assoc. Prof. Dr. Natasha Dejdumrong  
Program Chairperson

Name ..... Student ID. .... Seat Number .....

**Part 1 Please fill in the blank in each question below. (25 points)**

(1.1-1.9 1 point each)

- 1.1) The smallest data item a computer can process is called a(n) \_\_\_\_\_.
- 1.2) A program module in C is called \_\_\_\_\_.
- 1.3) A variable that is known only within the function in which it's defined is called \_\_\_\_\_.
- 1.4) Lists and tables of values are stored in \_\_\_\_\_ variables.
- 1.5) In order to use their own functions, the programmer must \_\_\_\_\_, and \_\_\_\_\_ the functions.
- 1.6) The function \_\_\_\_\_ reads data from a file in a manner similar to how *scanf* reads from *stdin*.
- 1.7) A(n) \_\_\_\_\_ is a group of related records.
- 1.8) \_\_\_\_\_ are one-dimensional arrays of characters.
- 1.9) \_\_\_\_\_ is a special function designed specifically to read in a string(including space) from the keyboard.

**True or False**

(1.10-1.14 1 point each)

- 1.10) \_\_\_\_\_ An array can store many different types of values.
- 1.11) \_\_\_\_\_ All arguments to function calls in C are passed by value.
- 1.12) \_\_\_\_\_ The default case is required in the switch selection statement.
- 1.13) \_\_\_\_\_ The expression  $(x > y \ \&\& \ a < b)$  is true if either  $x > y$  is true or  $a < b$  is true.
- 1.14) \_\_\_\_\_ is a special function designed specifically to read in a string(including space) from the keyboard.

Short answers

(1.15-1.18 1 point each)

Show the value(s) of x after each of the following statements

1.15) `x = floor( 7.5 );` \_\_\_\_\_

1.16) `x = ceil( -6.4 );` \_\_\_\_\_

1.17) `x = 2 + ( rand( ) % 9);` \_\_\_\_\_

1.18) Consider part of the program

```
int table[ 3 ][ 3 ] = { { 1, 8, -2 }, { 2, 4, 6 }, { 5, 7, -1 } };
```

```
for(i=0;i<3;i++)
```

```
    for(j=0;j<3;j++)
```

```
        printf("%d\t",table[j][i]); /* i and j are previously declared */
```

Write the output of the program:

---



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1.19) Consider the following function

(2 points)

```
long foo( long n )
```

```
{
```

```
    if ( n == 0 || n == 1 ) {
```

```
        return n;
```

```
    }
```

```
    else {
```

```
        return foo( n - 1 ) + foo( n - 2 );
```

```
    } /* end else */
```

```
}
```

Write the output of this execution:

```
printf("%d\n", foo(5) );
```

---

1.20) Consider the following program

(5 points)

```
#include <stdio.h>

void a ( void ); /* function prototype */
void b ( void ); /* function prototype */

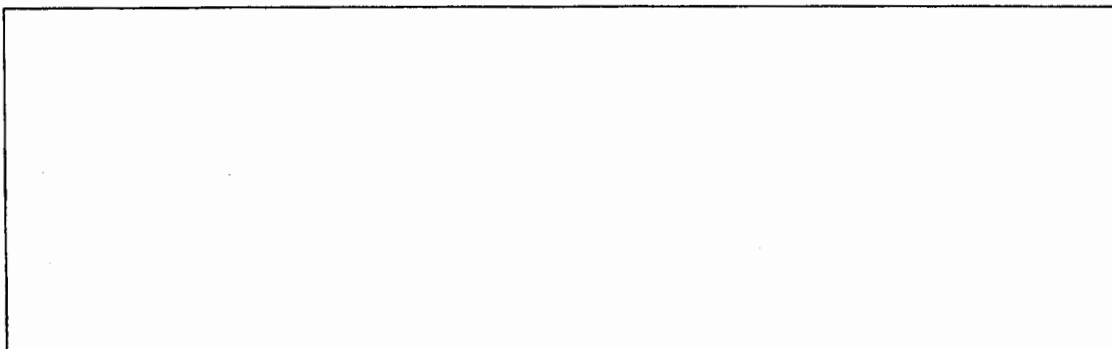
int x = 1;

int main ( )
{
    int x = 5;
    printf("x at point 1: %d\n", x );
    {
        int x = 7;
        printf("x at point 2: %d\n", x );
    }
    a ( );
    b ( );
    printf("x at point 5: %d\n", x );
}

void a ( void )
{
    printf("x at point 3: %d\n", x );
}

void b ( void )
{
    static int x = 50; /* static initialization */
    printf("x at point 4: %d\n", x );
}
```

Write the output of the program execution:



**Part 2 Please write the answer in the space provided (25 points)**

2.1) Write a set of statements to determine the sum the odd integers between 1 and 99 (e.g.  $1 + 3 + \dots + 99$ ) using a *for* statement. Assume the integer variables *sum* and *count* have been defined.

(4 points)

2.2) Write a set of statements to print the integers from 1 to 20 using a *while* loop and the counter variable *x*. Assume that the variable *x* has been defined, but not initialized. Print only five integers per line. [Hint: Use the calculation  $x \% 5$ . When the value of this is 0, print a newline character, otherwise print a tab character.]

(6 points)

2.3)

Write a function *min* that takes three integers and returns the smallest value.

```
#include <stdio.h>

int min(int num1, int num2, int num3); /* declare it */

int main ( ) {
    int a = 10;
    int b = 20;
    int c = 30;
    printf( "The smallest value is : %d\n", min(a, b, c) ); /* use it */
    return 0;
}
```

(5 points)

2.4)

Write a program to read in the student IDs, student names, scores(homework, midterm and final scores), and print out the student IDs, student names, and total score. The sample of input file ("input.txt") and output file ("output.txt") are given below: (Note the number of students is not specified so the program must read data in until the end of the file).

Input sample

60107501	Sophia	16.5	38	29.5
60107502	Emma	17.5	31.5	32
60107504	Olivia	11	29.5	38
60107505	Isabella	20	36	27
60107507	Ava	16.5	35.5	34.5
....				

Output sample

60107501	Sophia	84
60107502	Emma	81
60107504	Olivia	78.5
60107505	Isabella	83
60107507	Ava	86.5
...		

(10 points)

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2.4) (Continued)



