

Student Id. : (_____) , Name : (_____)

※ You may answer either in Korean or in English.

1. (20points) Write a C program that gets an arbitrary number of (**int** data type) positive integer values from keyboard, and prints the smallest value and the biggest value. To finish the keyboard input, give -1 at the end of the input. Input and output examples are as follows.

<pre>// Write your C code in this box.</pre> <div style="border-left: 1px dashed black; height: 200px; margin-left: 20px;"></div>	<p>Input Example: 13 7 11 2 55 42 31 9 6 -1</p> <p>Output Example: 2 55</p>
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2. (20 points) You can see a C program below that prints a diamond shape with a set of '*' characters.

Its input variable **n** is the number of '*' in the middle line of the output. The input/output examples are as follows. Fill out all the blanks with appropriate C codes in the following program.

<pre>#include <stdio.h> int main() { int n , i , j; scanf("%d" , &n); for (i = 0 ; i < n ; i++) { for (j = 0 ; _____ ; _____) _____ ; for (j = 0 ; _____ ; _____) _____ ; _____ ; } for (i = n - 1 ; i > 0 ; i--) { for (j = 0 ; _____ ; _____) _____ ; for (j = 0 ; _____ ; _____) _____ ; _____ ; } return 0; }</pre>	<p>Input : 5</p> <p>Output :</p> <pre style="text-align: center;"> * * * * * * * * * * * * * * * * * * * * * * * * *</pre>
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3. (10 points) What does following C program print as an output result? (_____)

```
#include <stdio.h>
int main()
{
    int x = 0 , a = 1 , b = 2 , c = 3;
    x = a ? b : c ;
    printf("x = %d" , x);
    return 0;
}
```

4. (15 points) What value is returned as a result of the call `f()` ? ()

```
int f ()
{
    int k , r = 0;
    for (k = 0 ; k < 8 ; k++) {
        if (( k % 3 ) == 1) r += k;
        else r = r + 1;
    }
    return r;
}
```

5. (15 points) Consider the following C code in which all variables are integers and `m` is bigger than 1.

<pre>// Pseudocode I int i , sum = 0 for (i = 1 ; i <= m ; i++) sum += i ; printf("%d\n" , sum);</pre>	<pre>// Pseudocode II int i , sum = 0 i = (a) _____ ; // <initial value> while ((b) _____) { // <condition> i++; sum += i; } printf("%d\n" , sum);</pre>
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The pseudocode II is intended to produce the same output as Pseudocode I. Fill out the blanks (a) and (b) with appropriate C codes so that Pseudocode II will produce the same output as Pseudocode I ?

6. (20points)

<pre>// source code (a) #include <stdio.h> int fact(int n); double compute_e(); int main() { printf("%lf\n" , compute_e()); return 0; } int fact(int n) { int i, product = 1; for (i = 1 ; i<= n ; i++) product *= i; return product; } double compute_e() { int i; double sum = 0.0; for (i = 0 ; i <= 8 ; i++) sum += 1 / fact(i); return sum; }</pre>	<pre>// source code (b) #include <stdio.h> int main() { int i = 1; int sum = 0; while (i <= 1000) { if ((i % 2) == 1) sum += i; else continue; ++i; } printf("%d\n" , sum); return 0; }</pre>
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(1) Source code (a) is intended to compute and print $\sum_{n=0}^8 \frac{1}{n!} = 1 + \frac{1}{1!} + \frac{1}{2!} + \dots + \frac{1}{8!}$, but the source code (a) generates a wrong result. Explain what is wrong in the source code (a) and why it is wrong.

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(2) How can you change the source code (a) to make the code correct? **Explain with less than 10 words.**

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(3) Source code (b) is intended to compute the sum of odd numbers between 1 and 1000, that is the value $(1+3+5+\dots+999)$,but the source code (b) generates a wrong result. Explain what is wrong and why it is wrong.

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(4) How can you change the source code (b) to make the code correct? **Explain with less than 10 words.**

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