Practice 05. Functions

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http://bi.snu.ac.kr
// 0 + 1 + 2 + ... + n
int sum(int n)
{
    if (n <= 0)
        return 0;
    return n + sum(n - 1)
}
// n-th value of the Fibonacci sequence (0, 1, 1, 2, 3, 5, 8, 13, ...)
int fibo(int n) {
    if (n <= 0)
        return 0;
    else if (n == 1)
        return 1;
    else
        return fibo(n - 1) + fibo(n - 2);
}
// a^b, assume b >= 0
int expo(int a, int b)
{
    if (b == 0)
        return 1;
    else if (b == 1)
        return a;
    else if (b == 2)
        return a*a;
    else if (b % 2 == 0) // b is even
        return expo( expo(a, b/2), 2);
    else // b is odd
        return a * expo( expo(a, (b-1)/2), 2);
}
Practice Submission

- Submit the practice problems if they are not checked in the class time.
- Submit the solution code of practice problem 01, 02 by email.
  - hnkwak@bi.snu.ac.kr
  - Mail title: prg_[student number]_practice05
    - prg_2014-12345_practice05
- Submit two source files named p01.c, p02.c, for each problem.
- Due to: 4/8(Wed) 23:59 pm
Assignment Submission

- Create a directory named assignment in your home directory.
- Create a directory named 05 in your assignment directory.
- Put your C files named p[# of problem].c for each problem.
  - p01.c
  - p02.c
  - ...
- Due to: 4/8(Wed) 23:59 pm
Complete the following code.

```c
int main(void)
{
    int n; // the number of matrix
    int i;
    scanf("%d", &n);

    for (i = 0; i < n; i++)
    {
        double a11, a12, a21, a22; // elements of a 2*2 matrix
        scanf("%lf%lf%lf%lf", &a11, &a12, &a21, &a22);
    }
}
```
if (no_inverse(a11, a12, a21, a22))
    printf("invalid matrix\n");
else
{
    // elements of the inverse matrix
    double b11, b12, b21, b22;
    b11 = inv_11(a11, a12, a21, a22);
    b12 = inv_12(a11, a12, a21, a22);
    b21 = inv_21(a11, a12, a21, a22);
    b22 = inv_22(a11, a12, a21, a22);
    printf("%f %f %f %f\n", b11, b12, b21, b22);
}
return 0;
### Input

5
1 2 1 2
1 2 3 4
5.4 2.2 6.4 1.2
1 1 0 1
10.52 7.12 29.5 -52.4

### Output

invalid matrix
-2.000000 1.000000 1.500000 -0.500000
-0.157895 0.289474 0.842105 -0.710526
1.000000 -1.000000 -0.000000 1.000000
0.068831 0.009353 0.038750 -0.013819
practice 02 – recursive function

- The input contains two integers $n$, $k$ (0 < $n$ < 10, 0 <= $k$ <= $n$)
- Output $\binom{n}{k}$.
- Use the recursive function. Note that
  $$\binom{n}{k} = \binom{n-1}{k} + \binom{n-1}{k-1}$$
  and
  $$\binom{n}{n} = \binom{n}{0} = 1$$

[Input]
7 3

[Output]
35
assignment 01 – prime numbers

- Complete the following code.

```c
int main(void)
{
    int p = 2;
    // print all prime numbers less than 100
    for(; p < 100; p = next_prime(p))
        printf("%d\n", p);
    return 0;
}
```
assignment 02 – recurrence relation

\[
\begin{align*}
    a_n &= a_{n-1} - b_{n-1} \\
    b_n &= 2a_{n-1} + b_{n-1} \\
\end{align*}
\]

(a_1 = 1, b_1 = 1)

- Output the \( a_n \) for a given integer \( n \) in the input. (1 \( \leq \) n \( \leq \) 10)

[Input]
4

[Output]
-6