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C coding standard

- Name: Make Names Fit!
  - Variable names
    - Use lower case letters
    - Use '_' as the word separator
  - Function name
    - Should explain function's action
    - Ex) check_for_errors() better than error_check()

- Parens(): space for keywords
  - Put a space after keywords
    - Ex) if (), elseif (), while ()
  - No space after function
    - Ex) strcpy(), printf()
Recursion - start

- A function is said to be recursive if it calls itself, either directly or indirectly.

```c
#include <stdio.h>

void count_down(int n);

int main(void)
{
    count_down(10);
    return 0;
}

void count_down(int n)
{
    if (n) {
        printf("%d ", n);
        count_down(n - 1);
    } else
        printf("\nZERO!\n"实用的 15");
}

// Output:
// 10! 9! 8! 7! 6! 5! 4! 3! 2! 1!
// ZERO!
// output = 5 + 4 + 3 + 2 + 1 = 15
```

✓ Calculate the sum of the first n positive integers (ex. Input 5, output = 5 + 4 + 3 + 2 + 1 = 15)
Recursion – Euclidean algorithm

- Way to get gcd (great common divisor) of two numbers
  - Ex) gcd(1071, 1029)

  1071 = 1029 * 1 + 42
  1029 = 42 * 24 + 21
  42 = 21 * 2

✓ Write program that computes gcd of two positive integers

```c
int main(void)
{
    int num1, num2;
    scanf("%d %d", &num1, &num2);
    printf("gcd of %d & %d = %d\n", num1, num2, gcd(num1, num2));
    return 0;
}
```

< Input & output >

78696 19332
gcd of 78696 & 19332 = 36
Recursion – factorial

- Write program that computes factorial

```c
int main(void)
{
    int num;
    scanf("%d", &num);
    printf("%d! = %d\n", num, fact(num));
    return 0;
}
```

< Input & output >

```
5
5! = 120
```
Recursion – exercise 1

- Write program that converts specific numbers into proper alphabet

\[
\begin{align*}
1 & \rightarrow a \\
9 & \rightarrow z
\end{align*}
\]

Ex) 930419039 → z304az03z
Recursion – exercise 2

1. Positive integer $n$ is entered
2. If $n$ is odd number do $3n+1$
3. If $n$ is even number do $n/2$
4. Do process 2~3 until $n$ becomes 1

Ex) $5 : 5 \rightarrow 16 \rightarrow 8 \rightarrow 4 \rightarrow 2 \rightarrow 1$
Length of this sequence is 6

Make a program that outputs number with longest length & it’s length between input $a$ & $b$
$1 \leq a \leq b \leq 10,000,000$

Ex)
Input :  1 10
Output : number : 9
Length : 20