Department of Computer Science & Engineering
I. I. T. Kharagpur
Computer Architecture & OS (*Laboratory*) : CS43051
3rd Year : 1st Semester
Laboratory Test I (**Even Machine Numbers**)

Section : EE/EG *8th September, 2004* (**1415 - 1600 hrs**) *Marks:* [**20**]

Write a C program that does the following.

- Reads two non-negative integers m and n using scanf().
- Computes the GCD (HCF) of m and n by inline assembly language code of pentium (no separate function).
- Prints n, m and GCD(m, n) using printf().
- Clearly write C comment (**not** within the **asm**) at the end of the program, explaining your assembly language code.

```
/************* GCD ******************/
int main() {
 int n, m, gcd ;

 printf("Enter two non-negative integers: ") ;
 scanf("%d%d",&n,&m);

 asm(
     ".MyL1:              # Label \n\t"
     "cmpl $0, %%ecx      # if m == 0 \n\t"
     "je .MyL3            # goto .MyL3 \n\t"
     "movl $0, %%edx      # edx <- 0 \n\t"
     "idivl %%ecx         # edx:eax/ecx \n\t"
     "movl %%ecx, %%eax   # eax <- dividend \n\t"
     "movl %%edx, %%ecx   # ecx <- divisor \n\t"
     "jmp .MyL1           # goto .MyL1 \n\t"
     ".MyL3:              # Label \n\t"
     "movl %%eax, %0      # gcd <- eax \n\t"
     :"=r"(gcd)
     :"a"(n), "c"(m)
     :"%edx"
    );

 printf("\ngcd(%d,%d) = %d\n",n,m,gcd);
}
```

Department of Computer Science & Engineering
I. I. T. Kharagpur
Computer Architecture & OS (*Laboratory*) **: CS43051**
3rd Year : 1st Semester
Laboratory Test I (**Odd Machine Numbers**)

Section : EE/EG *8th September, 2004* (**1415 - 1600 hrs**) *Marks:* [**20**]

We define $\log(n, k) = m$, where n and k are two integers so that $n > 0$ and $k > 1$, and $k^m \leq n < k^{m+1}$. Write a C program that does the following.

- Reads two non-negative integers $n > 0$ and $k > 1$ using scanf().
- Computes the value of $\log(n, k)$ by inline assembly language code of pentium (no separate function).
- Prints n, k and $\log(n, k)$ using printf().
- Clearly write C comment (**not** within the **asm**) at the end of the program, explaining your assembly language code.

```
/************** log *****************/
int main() {
 int n, k, log ;

 printf("Enter a positive integer: ") ;
 scanf("%d",&n);
 printf("Enter an integer > 1: ") ;
 scanf("%d",&k);
 asm(
      "movl $0, %0        # log <- 0 \n\t"
      ".MyL1:             # label \n\t"
      "cmpl %%ecx, %%eax  # if n < k \n\t"
      "jl .MyL2           # goto .MyL2 \n\t"
      "movl $0, %%edx     # edx <- 0 \n\t"
      "idivl %%ecx        # edx:eax/ecx \n\t"
      "incl %0            # %0++ \n\t"
      "jmp .MyL1          # goto .MyL1 \n\t"
      ".MyL2:             # label \n\t"
     :"=b"(log)
     :"a"(n), "c"(k)
     :"%edx"
    );
 printf("\nlog(%d,%d) = %d\n",n,k,log);
}
```