CS13002 Programming and Data Structures, Spring 2006

Class test 1

Total points: 30 | February 08, 2006 | Total time: 1 hour

Roll no: 05FB1331 **Name:** Foolan Barik **Section:** @

Write your answers in the question paper itself. You may use extra blank sheets for rough work, but your answers must fit in the respective spaces provided. Not all blanks carry equal marks. Evaluation will depend on the overall correctness of your solutions. Answer all questions.

1. The following program computes the sum of the digits in the decimal representation of a non-negative integer. For example, the sum of the digits of 320127 is $3 + 2 + 0 + 1 + 2 + 7 = 15$. Fill in the blanks with appropriate C constructs. **(10)**

```
#include <stdio.h>

int main ()
{
   unsigned int n, d, sum;

   /* Read the unsigned integer n*/

   scanf("%u", &n );
   /* Initialize sum to zero*/

   sum = 0;
   /* Loop as long as n is not reduced to zero*/

   while ( n > 0 ) {
      /* Store in d the least significant digit of n*/

      d = n % 10 ;
      /* Add this least significant digit to sum*/

      sum = sum + d ;
      /* Remove this digit from n*/

      n = n / 10 ;
   }
   /* Print the sum of digits of the input integer*/

   printf("The sum of digits is %d \n", sum );
}
```

2. Determine what the following program prints. You must supply your complete IITKGP roll number to the program (like **05FB1331**). **(10)**

```
#include <stdio.h>

int main ()
{
   char roll[10];

   printf("Enter your roll number : "); scanf("%s",roll);
   printf("Roll number : %s\n", roll);
   printf("Department  : %c%c\n", roll[2], roll[3]);
   printf("Year        : %d\n", 2000 + (int)(roll[1]-'0'));
}
```

The last three lines in the output of the above program are:

```
Roll number : 05FB1331
Department  : FB
Year        : 2005
```

3. Complete the following program that reads an integer $n \geqslant 2$ and prints the smallest integer $d \geqslant 2$ such that n is an integral multiple of d^2. If no such d exists, print -1. For example, for $n = 49$, $n = 50$, and $n = 51$, your program should respectively print $d = 7$, $d = 5$, and $d = -1$. Do not make any function calls (including math library calls). Use built-in arithmetic and conditional operators only. Do not use any variables other than **n,d,t**. You may use **t** as a temporary variable. **(10)**

```
#include <stdio.h>
int main ()
{
   int n, d, t;
   printf("Enter a positive integer >= 2 : "); scanf("%d",&n);









   d = -1;
   t = 2;
   while ( (d == -1) && (t*t <= n) ) {
      if ( n % (t * t) == 0 ) d = t;
      ++t;
   }









   printf("The desired value of d = %d\n", d);
}
```