

ESc101N: Fundamentals of computing(Lab Session 3)

August 17, 2009

Instructions

1. Please read the question carefully and write the program accordingly
2. Make sure that the TA has graded you program
3. The marks are distributed as follows. You get 60% of the marks if the basic algorithm is current, 20% if you manage to compile and execute and 20% for writing the code cleanly, i.e. using proper variable names, intending and making the code more readable.

Question 1. Write a program to compute the sum of digits of an input integer.

- (a) (5 marks) Write an iterative, i.e. using loops, function `int sumdigit()` to compute the sum of digits.
- (b) (5 marks) Let $S(n)$ denote the sum of digits of the integer n . Consider the following recursive definition of $S(n)$

$$S(n) = \begin{cases} 0 & \text{if } n = 0, \\ n \bmod 10 + S(n \operatorname{div} 10) & \text{otherwise.} \end{cases}$$

Use this definition to give a recursive function `int sumdigitRec()` to find sum of digits.

The sample output is given below

```
$ ./sumdigit
enter the number: 123983
the sum of digits of 123983 are:
    Iterative: 26
    Recursive: 26
$
```

Question 2. (0 marks) This question is for those who have completed the Question 1. There are no marks for this question, however it illustrates how to compile functions separately.

Try out separate compilation that was discussed in the class today. Write the definitions of functions `int sumdigit(int)`, `int sumdigitRec(int)` and the main function `int main(void)` in files `sumdigit.c`, `sumdigitRec.c` and `main.c` respectively. Compile/Debug them separately and link them together to obtain the executable.