

## ESc101N: Fundamentals of computing(Lab Session 8)

October 8, 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, indenting and making the code more readable.

---

**Question 1.** Consider the following structure

```
struct Vector {
    int dim; /* dimension of the vector */
    double *x;
};
```

Write the following functions.

- (a) (1 mark) Write a `typedef` statement so that one can start declaring vector objects as `Vector x` instead of `struct Vector x`.
- (b) (2 marks) Write functions `Vector allocVector(int n)` and `void freeVector(Vector v)` to allocate and free space for an  $n$  dimensional vector.
- (c) (2 marks) Write a functions `void readVector(Vector *)` and `void writeVector(Vector)` for reading and writing vectors.
- (d) (5 marks) Write a function `Vector norm(Vector)` that norm or length of the vector. Recall that the norm of a vector  $\mathbf{v}$ , denoted by  $\|\mathbf{v}\|$  is given by

$$\|\mathbf{v}\| = \sum_{i=1}^n v_i^2.$$