ESc101N: Fundamentals of computing(Lab Session 8)

October 10, 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. 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 `double innerproduct(Vector, Vector)` that computes the inner product of two vectors. Recall that the inner product of two vectors $\mathbf{u}$ and $\mathbf{v}$, denoted by $\langle \mathbf{u}, \mathbf{v} \rangle$ is given by

$$\langle \mathbf{u}, \mathbf{v} \rangle = \sum_{i=1}^{n} u_i v_i.$$