Exercise Session 11

January 25, 2013

1. Write a different program for each of the following point using the type traits, available in the header file type_traits .
   (a) Statically check if a template parameter of a class is **int** or **double**; rise an error otherwise.
   (b) Declare a function template that prints the variable passed as argument. Statically check if the latter is not a raw pointer.
   (c) Declare **unsigned int** i, then declare a **float** or an **int** if i is signed or unsigned, respectively, without knowing the type of i explicitly. Check the result.
2. Write a program that perform a dot product of two arrays using the template metaprogramming technique. Using the following hints:
   - Use the container std :: array to store the two vectors.
   - Declare a class templetized on the index, using a std :: size_t (you need to include <cstdef>) to declare the template parameter. size_t is the type used to address arrays, in this way you avoid errors.
   - In the class introduce a static method, called apply, which perform one operation of the dot product and calls again apply with the index decreased by one. Beware, this method should be **inline** .
   - Specialize the method apply for the case of zero index.
   - Overload a **operator** $*$ that implements the dot product using the class just defined. It is better if it returns a constexpr.