Graphics Basic Lab

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Assignment Sheet 3

a)Explain the terms variable, reference and pointer.

Variable - is a value that can change, depending on conditions or on information passed to the program.

Taken from : http://whatis.techtarget.com/definition/variable

Reference- allow you to create a second name for the a variable that you can use to read or modify the original data stored in that variable

Taken from: http://www.cprogramming.com/tutorial/references.html

Pointer- a variable which stores the address of another variable

Taken from : http://www.cplusplus.com/doc/tutorial/pointers/

What is the semantic difference between reference and pointer ?

Difference between **reference** and **pointers**:

1. You cannot have NULL references. You must always be able to assume that a reference is connected to a legitimate piece of storage.
2. Once a reference is initialized to an object, it cannot be changed to refer to another object. Pointers can be pointed to another object at any time.
3. A reference must be initialized when it is created. Pointers can be initialized at any time.

Taken from: http://www.tutorialspoint.com/cplusplus/cpp_references.htm

What is the difference for the compiler ?

For compiler it is absolutely different, because these both operators do different things. For example pointer points to whatever address has been assigned to it most recently. A reference refers to a particular value, forever.

b)Understand and explain the following code snippet!

Source code with the comments are attached with this file.

c)Explain call by value, call by reference and call by pointer. What exactly is done on calling? Give detailed runtime costs for large Objects?Which objects can be written to?

We have 3 functions:

Call by value is a void function which doesn't return anything, its just internally changes the value , but it has no influence to the real variable because of being void.

Call by reference is a void function too, but in the function, the reference has access to the actual variable which is used in the call. This means that it influence the value of the variable.

Call by pointer is void function,the job of this operator is to connect to the memory and change the value which is stored there. This means that although this function doesn't returns anything it changes the value of the variable on memory level

Among three this procedures we can define that **call by value** is so called “expensive” one. Because it creates one more local variable which needs memory. The “cheapest” here is **call by pointer** because it has direct access to the memory where our variable is located so we don’t need additional things.

d)Understand and explain the following code. What are the results? Is there undefined behaviour?

Source code with the comments are attached with this file.

e)Understand and explain how the elements of the array are accessed without using operator [ ]:

Source code with the comments are attached with this file

f)Below are three versions for printing array backwards. Which versions work and what problems do the others have?

Source code with the comments are attached with this file