***Essential characteristics of Java ?..............***

Analysis of Programming Languages (IAG0450)

Foreword. Evolution of Java.

The Java project started by James Gosling, Mike Sheridan, and Patrick Naughton in June

1991. The initial name of the language was Oak and it was intended to implement in smart

devices and TV. Sun Microsystems released first version of Java JDK 1.0 in January 1996.

Syntactic and semantic definition of language.

Java belongs to so-called C family of programming languages and has similar syntax to other members of this family like C, C++ and C#.That is the reason why many features of C or C++ syntax take place in Java. Similarities with other members of C-family are next: syntax of all basic operations (mathematical, logical), names of build-in elementary data type (except boolean), beginning and end of the blocks are defined by parenthesis, the end of the statement is semi-colon, syntax of conditional statements like if/else or switch/operations, syntax loop statements ( for, while and do/while), declaration of variables in style <access\_modifier>[type] [name\_of\_variable], names and usage of access modifiers (public, private and protected) are same like in C++ or C#,

Semantically Java is algorithmic, concurrent, class-based, object-oriented programming language. Like in case of syntax semantic similar to all representatives of C family, especially to C#. Here are set of statements comparing semantic of Java with other ones:

 Unlike C++ semantic of Java does not allow default values of arguments.

All methods of the classes are virtual by default and can be overridden in inherited classes.

 In Java all primitive parameters are passed by value, it has not C++ style passing by reference.

 Pointers, which are milestones of C/C++ programming that, allow direct manipulating with memory addresses don exist in Java. Java (like in C#) has references to objects (not to primitive types), other references and arbitrary memory locations.

 In Java like in C# and unlike in C++ native types have value semantics and user-defined types like classes have reference semantic. For example objects should be created using operator new (), otherwise user gets another one reference to an object or an empty reference.

 Java does not support operator

overloading.

 Java has such immutable type of data like string - a sequence of Unicode symbols. Once created it can't be modified, any attempts of modification will lead to creation of new modified string in memory, and same time first original one will be kept memory. Exactly same semantic mechanism is implemented in C#.

 Java doesn't support unsigned integer types like C/C++/C# languages do it.

Reliability

The C++ has greatest influence on Java, but some of its low-level operations like direct operations with memory were meaningly excluded from Java by reliability reasons