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Object Oriented Programming JAVA

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JVM

JAVA VIRTUAL MACHINE - JVM

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- JVM is not a machine – it is a program
- JVM is the heart of entire java program execution process.

First we should know java's compilation and execution process

Compilation & Execution process of JAVA

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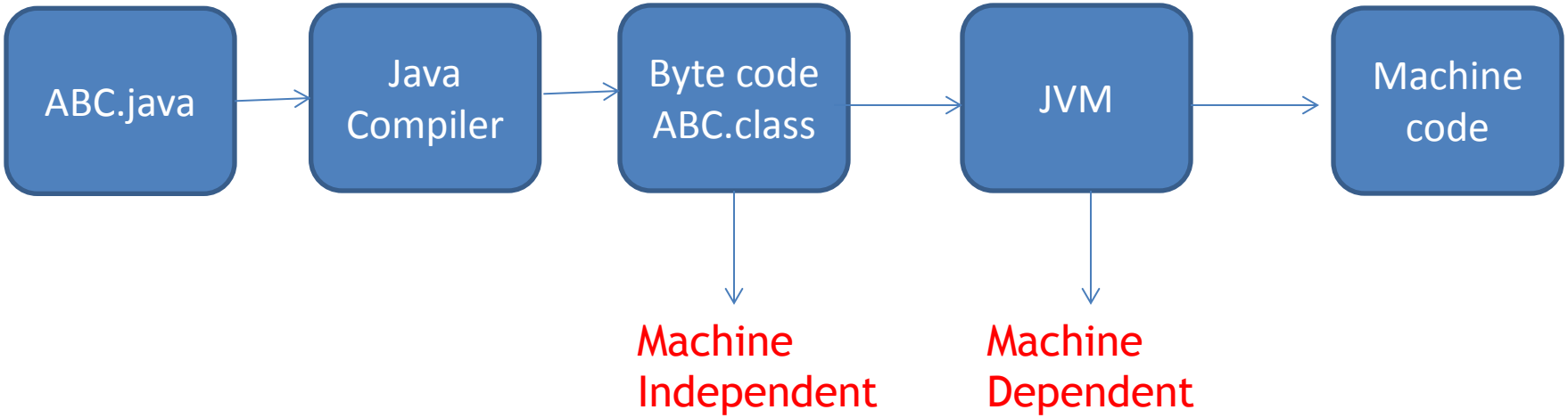

- What is the responsibilitty of JVM?

  It takes .class file and converts each byte code instruction into the machine code with respective to individual OS

Internal Architecture of JVM

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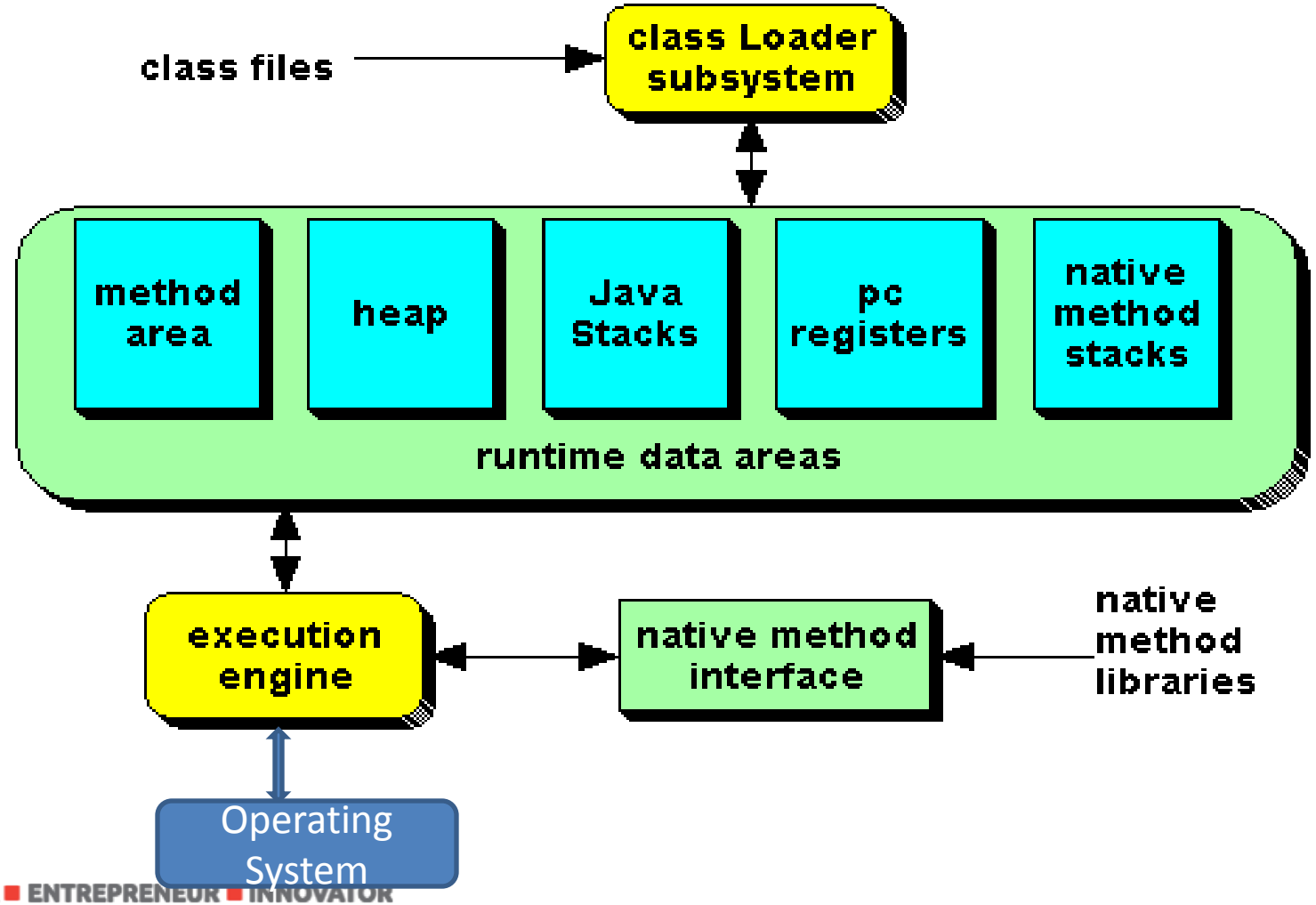

Components in JVM Architecture

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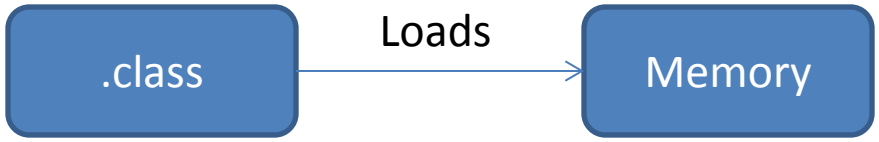
Class Loader Sub System

- It is a module(or program)
- It performs the following functions
  1. It loads .class file into memory



  2. Class load subsystem verifies byte code :

     If byte code instructions are proper then allocates memory for program execution or else execution is rejected.

Run-time Data Areas [1]

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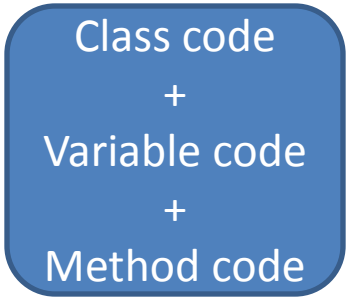
- Method Area

  It is the memory block ,which stores the code of class,code of variables and code of the methods.



- Heap Area

  This is the area where objects are created.

Whenever JVM loads a class, method area and heap area are immediately created in it.

Run-time Data Areas [2]

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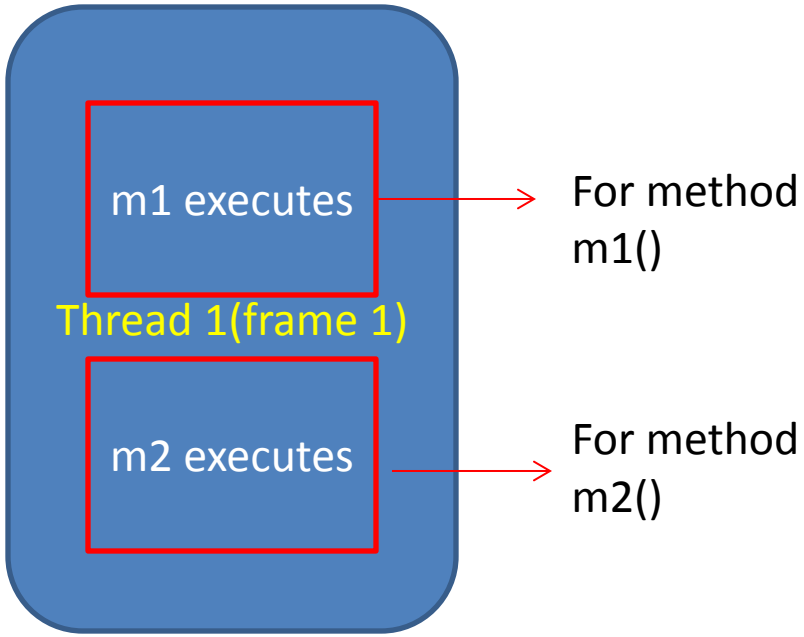
- Java Stacks

  1. While executing methods, a separate frame will be created in the java stack, in the place where method is executed.
  2. JVM uses a separate thread to execute each method.



Run-time Data Areas [3]

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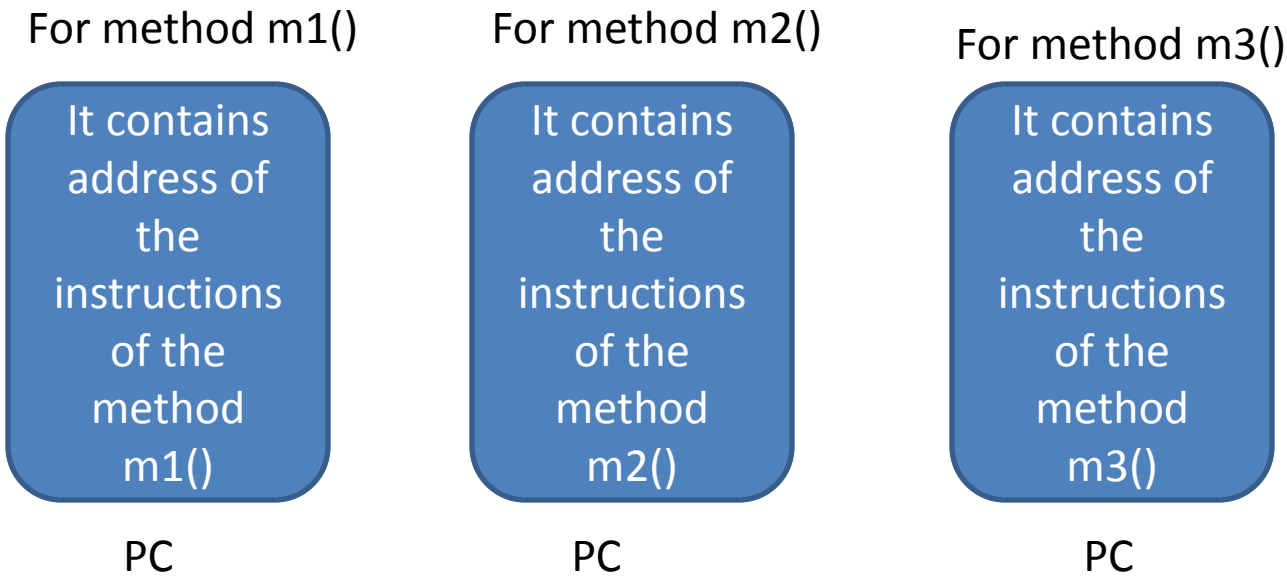
- PC Register (Program Counter)

  1. These are registers (memory areas), which contains memory address of the instructions for the methods.

  2. If there are 3 methods, 3 PC registers will be used to track the instructions of the methods.



Run-time Data Areas [4]

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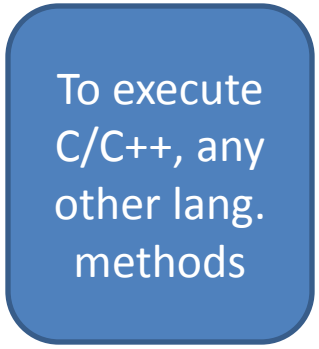
- Native Method Stacks

  1. Native Methods (for ex: C/C++ functions/methods) are executed on native method stack.

  2. To execute native methods, generally native method libraries(for ex: C/C++ header files) are required

  3. These header files are located and connected to JVM by a program, called native method interface.



Native method stack