DNA Sequencing Using Higher Order Logic[HOL] & Stochastic Processes as Mathematical Tools towards Next Generation/Hi-End Bio-Informatics R&D Frameworks in the Context of [OPAL/Byte Code Engineering/Scala/Java/JikesRVM(RVM-Research Virtual Machine) /JavaVirtual Machine/Metascala-Scala JVM/IoT/HPC Heterogeneous Computing Environments]

[Scala/Java/JVM based Languages – The Next BIG Thing in IoT/HPC/Bio-informatics/BIGDATA Revolution – Advanced Software Architecture R&D]

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[I] Inspiration & Introduction :

"Higher order Logic provides a comfortable way of solving or computing the sequencing problems and related issues in the advancement of bio-informatics,hence we have focused in this interdisciplinary paper on HOL and its applications, in the design of such biodevices. "

Nucleic Acids Data Sequencing using Higher Order Logic-A Suggestion of Basic Computational Framework Towards Bio-Sensors and Gene-Chips Design, Implementation and Verification

By D.N.T.Kumar et al –

[Source : http://journaldatabase.info/articles/nucleic_acids_data_sequencing_using.html]

Statistical Methods in Bioinformatics : An Introduction by Warrenr Ewans & Gregory Grant Springer -ISBN 0-387-40082-6 © 2005 Springer Science+Business Media, Inc.

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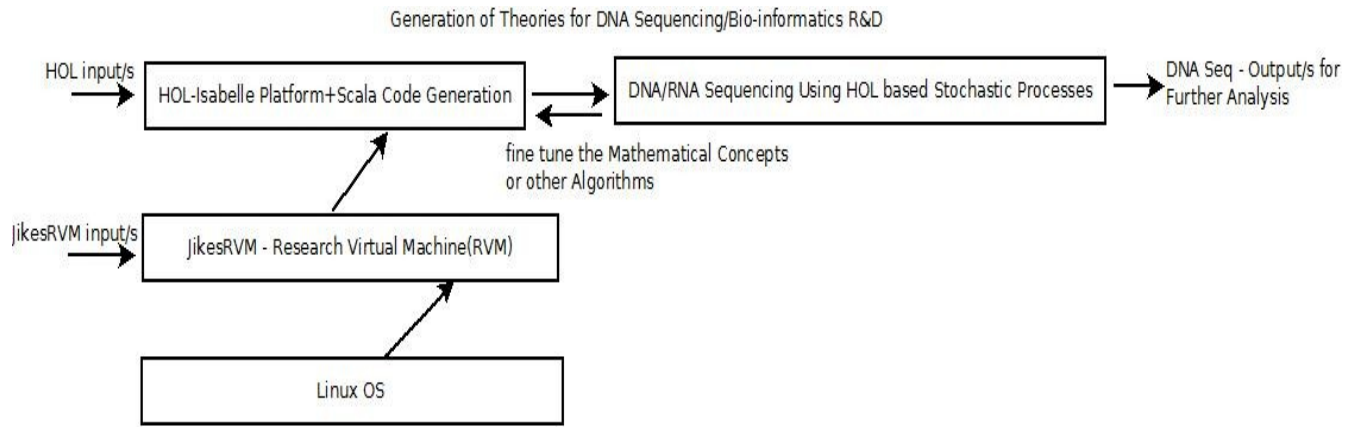
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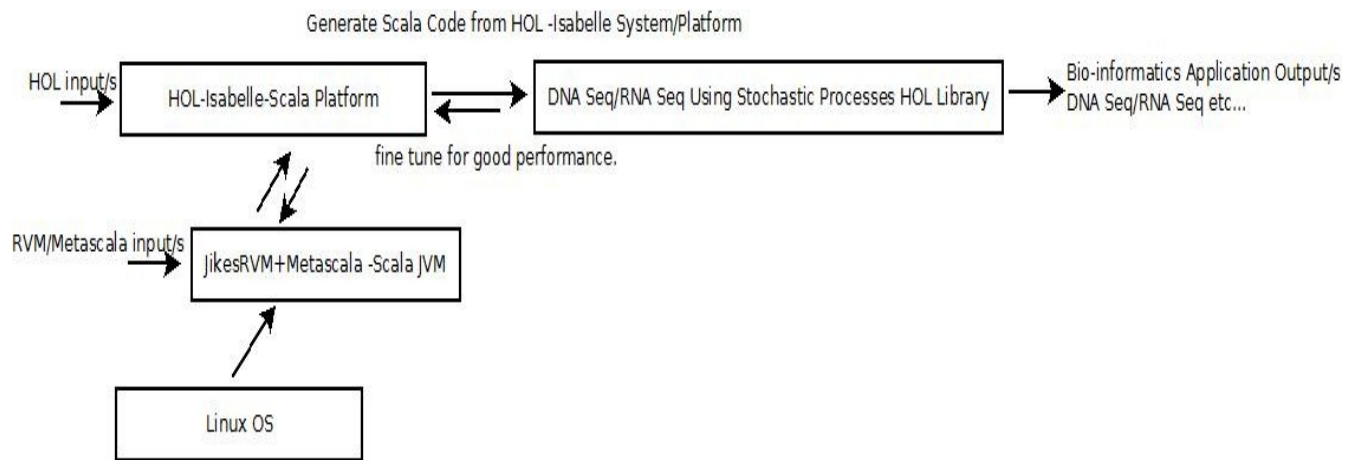https://www.journals.elsevier.com/stochastic-processes.../most-downloaded- articles

https://hedleyproctor.com/2014/11/writing-a-dsl-with-scala-parser-combinators/

https://dl.acm.org/citation.cfm?id=2088273 - Mnemonics: type-safe bytecode generation at run time.

[II] Bio-informatics R&D Framework/s :

Generation of Theories for DNA Sequencing/Bio-informatics R&D

HOL input/s → HOL-Isabelle Platform+Scala Code Generation ⇄ DNA/RNA Sequencing Using HOL based Stochastic Processes → DNA Seq - Output/s for Further Analysis

fine tune the Mathematical Concepts or other Algorithms

JikesRVM input/s → JikesRVM - Research Virtual Machine(RVM)

Linux OS

Algorithm I - Bio-informatics Platform Implementation -Approximate Suggestion-Actual Implementation might vary.
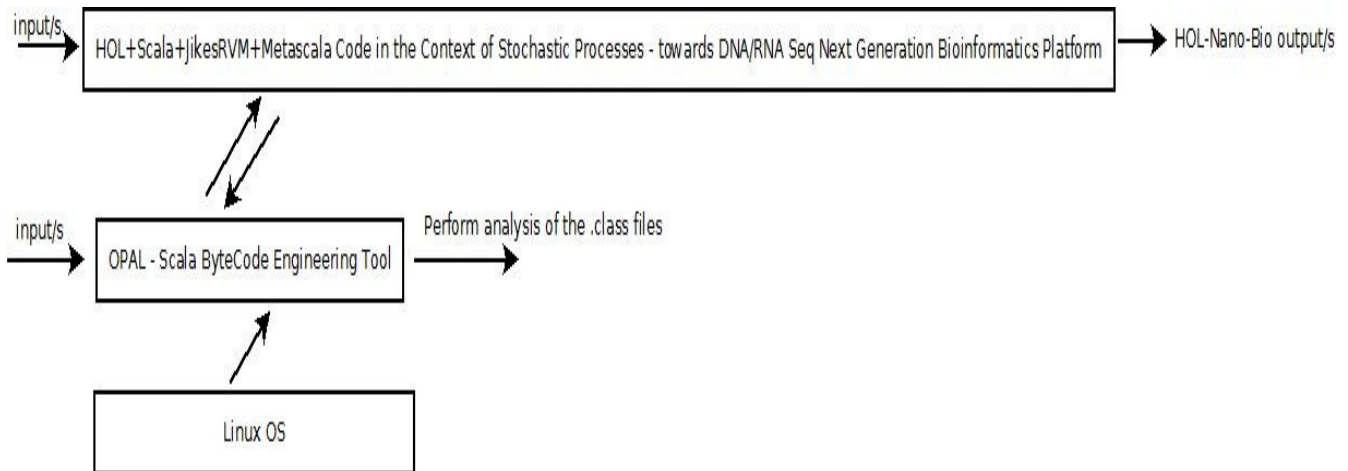Please Check.
Thanks - Dr.Nirmal.

[Figure I – Algorithm I – Informatics R&D Platform – Testing in Progress]

Generate Scala Code from HOL -Isabelle System/Platform

HOL input/s → HOL-Isabelle-Scala Platform ⇄ DNA Seq/RNA Seq Using Stochastic Processes HOL Library → Bio-informatics Application Output/s DNA Seq/RNA Seq etc...

fine tune for good performance.

RVM/Metascala input/s → JikesRVM+Metascala -Scala JVM

Linux OS

Algorithm II - Bio-informatics Platform-HOL-Stochastic Processes HOL Library based DNA/RNA Seq.
Thanks -Dr.Nirmal.

[Figure II – Algorithm II – Informatics R&D Platform – Testing in Progress]

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http://uk.droidcon.com/explore?q=tag%3Ametascala }

Algorithm III - OPAL based Option to perform analysis of .class files
BYTECODE ENGINEERING IS AN IMPORTANT ASPECT
NEGLECTED OFTEN in JVM Environments.
Please Check & Satisfy Yourself.
Actual Implementation/s could vary.
Thanks - Dr.Nirmal.

[Figure III – Algorithm III – Informatics R&D Platform – Testing in Progress]

Additional Information on Mathematical Concepts/Software Used :

[a] https://www.jikesrvm.org/

[b] dmakarov.github.io/work/guide/

[c] https://github.com/lihaoyi/**Metascala** - Scala Virtual Machine -**Metascala** is a tiny metacircular Java **Virtual Machine** (JVM) written in the Scala programming language .

[d] https://github.com/.../**Metascala**/.../**metascala**/full/MetacircularTest.scala

[e] https://www.sciencedirect.com/science/article/pii/S016764230700175X

[f] https://uwspace.uwaterloo.ca/handle/10012/3752

[g] *https://www.oreilly.com/library/view/core-java-volume/.../ch10lev1sec7.html*

[h] *www2.sys-con.com/itsg/virtualcd/java/archives/0901/chiba/index.html*

[i] http://vixra.org/author/nirmal_tej_kumar - Check for some IoT/HPC Architecture in these papers.

[j] http://vixra.org/author/n_t_kumar && http://vixra.org/author/d_n_t_kumar

[k] http://vixra.org/author/nirmal && http://vixra.org/abs/1709.0412

[III] Future Conclusion/s :

JVM based languages like Scala/Java is/are the next BIG thing in IoT/HPC Revolution.To the best of our knowledge, this is one of the pioneering communications in this promising domains of Bio-informatics.More R&D is required to advance next generation Bio-informatics Platforms.

[IV] Acknowledgment/s :

Special thanks to all WHO made this happen.Non-Commercial R&D.Non-Profit Academic R&D Only.

[V] Reference/s :

[1] http://vixra.org/abs/1907.0083

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Fabian Immler - Author: Fabian Immler/Supervisor: Prof. Tobias Nipkow, Ph.D.
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[19] https://bitbucket.org/delors/opal/commits/all

[THE END]