## **Basic Architecture and Applications of DNA Computing**

Nordiana Rajaee<sup>1</sup>\*, Azham Zulkharnain<sup>2</sup> & Awang Ahmad Sallehin Awang Hussaini<sup>2</sup>

<sup>1</sup>Faculty of Engineering, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, MALAYSIA.

<sup>2</sup>Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, MALAYSIA

\*Corresponding author. E-Mail: rnordiana@unimas.my; Tel: +6082-583277; Fax: +6082-583410.

Received: 20 March 2016 Revised: 7 April 2016 Accepted: 24 April 2016 In press: 25 April 2016 Online: 30 June 2016

*Keywords:* DNA Computing; Bio-inspired Computing

## Abstract

DNA computing is a new computing paradigm utilizing actual DNA oligonucleotides to do computation by employing biomolecular tools to get the reaction and outputs extraction. In this paper, we introduce basic architecture of DNA computing. Brief explanation on the biomolecular tools employed in DNA computing are also included, and its various applications in many fields are also discussed.

© Transactions on Science and Technology 2016

## Introduction to DNA computing

DNA or deoxyribonucleic acid works as a "memory" to store genetic information in cellular organism. Consisting of four bases A (adenine), T (thymine), C (cytosine) and G (guanine), these bases follow a Watson Crick complementary rule whereby A complements T, C complements G and vice versa. One DNA base is called an oligonucleotide and its length denoted in mer. DNA strands are often quoted in 5'-3' order and two single stranded DNA sequences may combine to form a double stranded DNA. The length of a double stranded DNA is denoted as base pairs. Figure 1 shows basic structure of a double helix DNA strand and its bases.



Figure 1. Structure of DNA