IB Computer Science
Objectives for September

4.3 introduction to programming

Students will be introduced to the Java programming language - building on what they learned about programming languages, algorithms, software and systems development and computer fundamentals last year.

Students will be able to demonstrate proficiency with the following curriculum objectives:

4.3 Introduction to Programming

Nature of Programming Languages

4.3.1   State the fundamental operations of a computer.
4.3.2   Distinguish between fundamental and compound operations of a computer.
4.3.3   Explain the essential features of a computer language.
4.3.4   Explain the need for higher level languages.
4.3.5   Outline the need for a translation process from a higher level language to machine executable code.

Use of Programming Languages

4.3.6   Define the terms: variable, constant, operator, object.
4.3.7   Define the operators =, ., <, <=, >, >=, mod, div.
4.3.8   Analyse the use of variables, constants and operators in algorithms.
4.3.9   Construct algorithms using loops, branching.

Students will be become familiar with the following IB Computer Science Stadards:

The use of the Approved Notation for Developing Pseudocode

The Pseudocode In Examinations guide

Flowcharting Guidelines

Students will demonstrate proficiency in the following Java programming skills:

1. Entering a java program in the Cloud9 environment
2. Compiling a java class using the javac compiler
3. Executing a compiled java program
4. Writing programs using built-in data types (integers, real numbers, Boolean chars, and String)
5. Using variables in assignment statements, expressions, input/output statements
6. Using constants
7. Performing type conversions between built-in data types
8. Using arrays
9. Reading user data from standard input
10. Sending user data to standard output
11. Processing command line arguments
12. Creating classes with properties/attributes, and methods
13. Using conditional statements and relational operators
14. Using the switch statement
15. Using iteration (for loops, do-while loops, while loops)
16. Writing java programs from pseudo-code
17. Using functions for the standard math libraries.

Students will demonstrate proficiency in the following Linux commands:

1. Creating directories using **mkdir**
2. listing the contents of a directory using **ls**
3. changing directories using **cd**
4. determining the current working directory using **pwd**
5. copying files using **cp**
6. viewing the contents of files using **more, head, tail**
7. compiling java programs using **javac**
8. executing java programs using the java virtual machine
9. executing programs using input redirection, output redirection, and piping