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# MALAYSIAN CURRICULUM ON STATISTICS

KURIKULUM STANDARD SEKOLAH RENDAH

# Matematik

**Dokumen Standard Kurikulum dan Pentaksiran**



# CURRENT REVIEW OF THE MALAYSIAN CURRICULUM

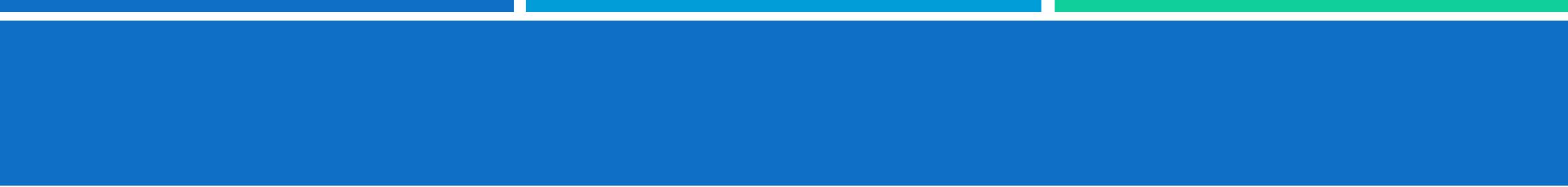
- Primary school: New Curriculum implemented in 2011
- Current revision done beginning 2015 (Year 1, 2 & 3 revised)
- Secondary school: New curriculum implemented in 2016
- New elements in the curriculum:
  - STEM APPROACH (Science, Technology, Engineering and Mathematics)
  - Cross-curricular elements

# STEM APPROACH

- Relate Knowledge, Skills and Attitudes to Society, Daily-life and the environment
- Aim is to enculture STEM ideas across the curriculum

## CROSS-CURRICULAR ELEMENTS

- Language
- Environmental Conservation
- Noble values (Nilai murni)
- Science and Technology
- Patriotism
- Creativity and Innovation
- Entrepreneurship
- ICT
- Global sustainability
- Financial literacy



Emphasis is to develop statistical reasoning through problem solving

- to formulate questions
- to collect data
- to analyse the data
- to interpret the results

# PRIMARY YEAR 1

- Collect, classify and arrange data
  - Collect data based on daily situation
- Pictograph.
  - Read and derive information from pictograph
- Problem solving
  - Solve problem involving daily situations

## PRIMARY YEAR 2

- Collect, classify and arrange data
  - Collect data based on daily situation
- Bar chart
  - Read and derive information from bar chart
- Problem solving
  - Solve problem involving daily situations

## PRIMARY YEAR 3

- Collect, classify and arrange data
  - Collect data based on daily situation
- Pie chart
  - Read and derive information from bar chart
- Relationship between pictograph, bar chart and pie chart
  - Show relationship between pictograph, bar chart and pie chart to represent information
- Problem solving
  - Solve problem involving data management in daily situations

## YEAR 4

- Collect, classify and compile data based on daily situations.
- Read and get information from the pie chart
- Relationships between pictographs, bar charts and pie charts to represent an information
- Problem solving involving managing data in a daily situation.

## PRIMARY YEAR 5

- Specifies mod, median, mean, range of values in pictographs and bar charts
- Explains the steps for constructing pictographs and bar charts.
- Determines the mod, median, min and range of the given data and determine the reasonableness of the answers as well as construct pictographs and bar charts.
- Solving routine daily issues involving data representation.
- Solving routine daily issues involving data representation using various strategies.
- Solve non-routine daily issues involving representations creatively and innovatively.

## PRIMARY YEAR 6 - DATA

- Interpreting data from pictographs, bar charts and pie charts.
- Solve daily problems involving:
  - a) Mod, median, min and range
  - b) Pictographs, bar charts and pie charts for a set of data.

## YEAR 6 - CHANCE

- Determine whether an event in a daily life may or may not happen
- Determine the likelihood of an event as impossible, less likely, equally likely, most likely or definitely

## SECONDARY FORM I

- Generate and pose statistical questions and collect relevant data.
- Classify data into numerical data categories and to build frequency tables – Discrete and continuous numerical data
- Build data representation for ungrouped data and justify the suitability of a data representation. Data representations include various types of bar charts, pie charts, line graphs, point plots and tree-and-leaf plots. Dot plots, stem and leaf plots
- Converting from one data representation to another appropriate representation with justifications
- Interpreting multiple data representations including making inferences or predictions
- Use various methods to build data representations including software.

## SECONDARY FORM 2 – MEASURES OF CENTRAL TENDENCY

- Determine the mod, min and median for an ungrouped data set
- Making conclusions about the effect of changing a data set on the mod, min and median
- Determines the mod and min classes for a set of grouped data
- Select and justify the use of appropriate measures of central tendency to describe the distribution of a data set, including data sets that have extreme values
- Determine the mod, min and median from data representation
- Apply an understanding of measures of central tendency to make predictions, convincing arguments and drawing conclusions

## FORM 2 - SIMPLE PROBABILITY

- Experimental probability
- Theoretical probability
- Determining the probability of an event
- Probability of a complementary event
- Explorations to be carried out by using the concept of set to form generalizations that:

$$P(A) + P(A') = 1$$

$$P(A') = 1 - P(A)$$

$$0 \leq P(A) \leq 1$$

# MALAYSIAN CURRICULUM ON INFORMATICS



KEMENTERIAN PENDIDIKAN MALAYSIA

KURIKULUM STANDARD SEKOLAH MENENGAH

## **Asas Sains Komputer**

**Dokumen Standard Kurikulum dan Pentaksiran**

# BASIC COMPUTER SCIENCE

- The Informatics Curriculum is written as a separate subject called Basic Computer Science

# FORM I

- Command Code Structures
- Command Codes
- HTML Command Code

# FORM 2

- Base 8 number system
- Base 16 number system
- Developing algorithms
- Command Code Environment
- Command Code Structures

# FORM 3

- Developing programs
- Cryptography in Data Security
- Development of Algorithms
- Database and SQL
- Command Code Structure

# FORM I (STANDARDS)

## Command Code Structures

- Write pseudocodes and construct multi-choice flowcharts in problem solving
- Write pseudocodes and draw flowcharts involving replication
- Detect errors in pseudocodes and flowcharts in trouble shooting
- Produce pseudocodes and flowcharts involving a combination of multi-choice and repetitions

# COMMAND CODES STANDARDS

- Use mathematical variables and operators in the developing program
- Produce programs that involve the use of multi-choice
- Generate programs that involve the use of replications
- Develop a program that involves the use of multi-choice, repetitions, variables and mathematical operators
- Test the program and fix the errors on the command code

# HTML COMMAND CODE (STANDARDS)

- Sketch story board to build a web page using HTML
- Use tags in HTML programs :<head>; <title>; <body> , <paragraph>
- Use HTML program to produce Banner, Frame and Menu.
- Construct text links and mages in HTML
- Write programs to include images in HTML
- Produce pull-down menus
- Include comment columns in HTML programs
- Detect errors in HTML programs that have been developed
- Construct interactive web-pages showing *Banner, Menu, Comment Column, Frame* and Pull-down menu

## FORM 2 STANDARDS

- Base 8 Number system
- Base 16 Number System
- Convert ASCII encoding to hexadecimal numbers based on given characters
- Relate hexadecimal numbers with ASCII encodings used in machine language

# DEVELOPING ALGORITHMS STANDARDS

- Write pseudo-codes and draw flow charts using
  - (i) optional nested control structures in problem solving
  - (ii) repeat control structures (for, while-do) in problem solving
- Detects and fixes errors in pseudocodes and flowcharts in troubleshooting
- Solve problems using pseudocodes and flowcharts by combining various control structures

# COMMAND CODE ENVIRONMENT STANDARDS

- Using data types (integer, boolean, double, char and string) in segment code.
- Distinguish between variables and constants in segment code
- Generate segment code using: (i) input and output functions, (ii) comparison operator, (iii) logical operator
- Detects and fixes errors on segmented code generated in problem solving
- Solve problems involving a combination of data types, variables, constants, and operators in segment code

# COMMAND CODE STRUCTURES STANDARDS

- Produce programs that involve:
  - (i) sequence control structure in problem solving
  - (ii) an optional control structure in problem solving
  - (iii) nesting control structures in problem solving
  - (iv) repeat control structures in problem solving
- Testing the program and fixing the errors on the generated command prompt
- Produce programs involving a combination of various control structures.

# FORM 3 DEVELOPING PROGRAMS (PROJECT) STANDARDS

- Using the concept of computational thinking in the development phase of the program to develop arithmetic programs:
  - (i) Problem analysis
  - (ii) Program design
  - (iii) Encoding
  - (iv) Testing and debugging
  - (v) Documentation
- Make a report on the use of computational thinking techniques for each phase of development
- Produce a mini-group project based on a situation in problem solving based on program development phases

# CRYPTOGRAPHY IN DATA SECURITY STANDARDS

- Ciphering process involving: (i) encryption, (ii) decryption
- Generate and translate messages using the following cipher methods:
  - (i) Reverse cipher
  - (ii) Substitution cipher (Caesar Cipher, Pigpen Cipher)
  - (iii) Transposition ciphers
- Comparing the differences in the methods of ciphering
- Selecting the best cipher method based on a given situation.
- Produce a method for solving problems in everyday life

# DEVELOPMENT OF ALGORITHMS STANDARDS

- Identify search features (linear, binary) and sort (bubble, bucket).
- Write pseudocodes and draw a flowchart showing: (i) linear search, (ii) binary search
- Write pseudocodes and draw a flowchart showing: (i) bubble sort, (ii) bucket sort
- Detect and repair errors in pseudocodes and draw flow charts for problem solving involving: (i) search, (ii) sort
- Comparing search algorithms and sort through pattern recognition.
- Producing an algorithm involving a combination of search and sort techniques.
- Producing an algorithm involving a combination of search or sort techniques.

# DATABASE AND SQL STANDARDS

- Explain meaning and usage of: (i) Database, (ii) Structured Query Language (SQL)
- Lists entities and attributes based on the situation in a problem.
- Identify and describe the primary and foreign keys.
- Identifying and clarifying cardinality between entities in the relationship: (i) one to one (1:1), (ii) one to many (1:M)
- Build a database consisting of: (i) entity (table), (ii) attribute (field), (iii) relationship
- Produce the form and insert the data in the table through the form of the database that has been constructed.
- Using SQL commands involving: (i) SELECT ..., (ii) SELECT ...WHERE, (iii) SELECT ... ORDER BY
- Using SQL commands involving Boolean expressions (i) Operator OR
- (ii) Operator AND
- Generating reports based on query results.

# COMMAND CODE STRUCTURE STANDARDS

- Explain the following structural functions in the program: (i) function, (ii) procedure
- Provide examples of use of statement of functions: (i) internal (built-in), (ii) self-generated (user-defined)
- Write function statements and procedures.
- Producing programs involving: (i) function, (ii) procedure
- Test the program and fix the errors on the program.
- Produce programs that involve a combination of command-line structures to solve problems in everyday life.