



ARAB UNITY SCHOOL

CURRICULUM OVERVIEW

Computer Science

YEAR 10

2021 – 2022

A guide for Parents and Students

SUBJECT: Computer Science

Year: 10

Overview of the year:

- The aims describe the purposes of a course based on this syllabus.
 - The aims are to enable students to develop:
 - computational thinking skills
 - an understanding of the main principles of solving problems using computers
 - the skills necessary to solve computer-based problems using a high-level programming language
 - an understanding of the component parts of computer systems and how they interrelate
 - an understanding of the internet as a means of communication and its associated risks
 - an understanding of the development and use of automated and emerging technologies.

Term	Topic	Activities / Assessments	Skills (SECRET)
TERM ONE	<p><u>Paper-1</u></p> <p>Data Representation</p> <ul style="list-style-type: none">• Understand how and why computers use binary to represent all forms of data.• Understand the denary, binary and hexadecimal number systems and number conversion.• Understand how and why hexadecimal is used as a beneficial method of data representation.• Understand the method to add two 8-bit numbers.• Understand the concept of overflow and why it occurs in binary addition.• Perform a logical binary shift on a positive 8-bit binary integer and	<p>Worksheets / Activities based on</p> <ul style="list-style-type: none">• Number conversions• Binary Addition• Shifting Bits• Negative representation	<p>Being an effective organizer, student will get a chance to reflect their understanding about the topic “Data Representation</p>

	<p>understand the effect this has on the positive binary integer</p> <ul style="list-style-type: none">• Use two's complement to represent positive and negative 8-bit binary integers• Understand how and why a computer represents text and the use of character sets, including American standard code for information interchange (ASCII) and Unicode• Understand how and why a computer represents sound, including the effects of the sample rate and sample resolution• Understand how and why a computer represents an image, including the effects of the resolution and colour depth• Understand how data storage is measured• Calculate the file size of an image file and a sound file, using information given• Understand the purpose of and need for data compression• Understand how files are compressed using lossy and lossless compression methods• Describe the processes involved in each of the following error detection methods for detecting errors in data after transmission: parity check (odd and even), checksum and echo check• Describe how a check digit is used to detect errors in data entry and identify		
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examples of when a check digit is used, including international standard book numbers (ISBN) and bar codes

- Describe how an automatic repeat query (ARQ) can be used to establish that data is received without error

Paper-2

- Declare and use variables and constants
- Understand and use the basic data types
- Understand and use input and output
- Understand and use the concept of sequence
- Understand and use the concept of selection
- Understand and use the concept of iteration
- Understand and use the concepts of totalling and counting
- Understand and use the concept of string handling
- Understand and use arithmetic, logical and Boolean operators
- Understand and use nested statements
- Understand what is meant by procedures, functions and parameters
- Define and use procedures and functions, with or without parameters
 - Understand and use local and global variables

Activities based on

- **Past pre release materials**
- **Trial and error method questions**
- **Worksheets**

<p>TERM TWO</p>	<p><u>Paper-1</u></p> <ul style="list-style-type: none"> ● Data Transmission <ul style="list-style-type: none"> ● Understand that data is broken down into packets to be transmitted and able to describe the structure of a packet ● Describe the process of packet switching ● Describe how data is transmitted from one device to another using different methods of data transmission ● Explain the suitability of each method of data transmission, for a given scenario ● Understand the universal serial bus (USB) interface and explain how it is used to transmit data ● Understand the need to check for errors after data transmission and how these errors can occur ● Understand the need for and purpose of encryption when transmitting data ● Understand how data is encrypted using symmetric and asymmetric encryption <p>Hardware Architecture</p>	<p>Worksheets / Activities based on</p> <ul style="list-style-type: none"> ● Data transmission methods based on the direction, size of data etc ● Different types of encryption methods 	<p>The task will help the student to incorporate their creative thoughts for the system implementation as a team work.</p> <p>As a reflection of their</p>

	<ul style="list-style-type: none"> • Understand the role of the central processing unit (CPU) in a computer • Understand what is meant by a microprocessor • Understand the purpose of the components in a CPU, in a computer that has a Von Neumann architecture • Describe the process of the fetch–decode–execute cycle including the role of each component in the process • Understand what is meant by a core, cache and clock in a CPU and explain how they can affect the performance of a CPU • Understand the purpose and use of an instruction set for a CPU • Describe the purpose and characteristics of an embedded system and identify devices in which they are commonly used <p>Input and Output devices</p> <ul style="list-style-type: none"> • Understand what is meant by an input device and why it is required • Understand what is meant by an output device and why it is required • Understand what is meant by a sensor and the purposes of sensors 	<p>Worksheets / Activities based on</p> <ul style="list-style-type: none"> • Computer Architecture. • Identify the components based on virtual representation • Types of storage devices and advantages and disadvantages 	<p>knowledge, student will be able to identify the hardware components..</p>
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	<ul style="list-style-type: none"> • Identify the type of data captured by each sensor and understand when each sensor would be used, including selecting the most suitable sensor for a given context <p>Data Storage</p> <ul style="list-style-type: none"> • Understand what is meant by primary storage • Understand what is meant by secondary storage • Describe the operation of magnetic, optical and solid-state (flash memory) storage and give examples of each • Describe what is meant by virtual memory, how it is created and used and why it is necessary • Understand what is meant by cloud storage • Explain the advantages and disadvantages of storing data on the cloud in comparison to storing it locally <p><u>Paper-2</u></p> <ul style="list-style-type: none"> • Understand and use library routines • Understand how to create a maintainable program • Declare and use one-dimensional (1D) and two-dimensional (2D) arrays • Understand the use of arrays 	<p>Activities based on</p> <ul style="list-style-type: none"> • Past pre release materials • Trial and error method questions • Worksheets 	
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	<ul style="list-style-type: none"> • Write values into and read values from an array using iteration • Understand the purpose of storing data in a file to be used by a program • Open, close and use a file for reading and writing 		
<p>TERM THREE</p>	<p><u>Paper-1</u></p> <p style="text-align: center;">Boolean logic</p> <p>Identify and use the standard symbols for logic gates</p> <p>Define and understand the functions of the logic gates</p> <p>Use logic gates to create given logic circuits from a:</p> <p>(i) problem statement</p> <p>(ii) logic expression</p> <p>(iii) truth table</p> <p>Complete a truth table from a:</p> <p>(i) problem statement</p> <p>(ii) logic expression</p> <p>(iii) logic circuit</p> <p>Write a logic expression from a:</p> <p>(i) problem statement</p> <p>(ii) logic circuit</p>	<p>Worksheets / Activities based on</p> <ul style="list-style-type: none"> • Identify logic symbols and its uses in real life situations • Solving boolean expressions using truth table • Develop logical expression based on real life scenarios 	<p>The task demands the scenario of enquiring more on the topic to make them reflective learners.</p> <p>The task will help the student to incorporate their creative thoughts and enquiries for designing basic logic circuits</p>

	(iii) truth table		
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