

OCR-specification GCSE Computer Science – Microsoft IT Academy Mapping

2.1.1 Fundamentals of Computer Systems		
Computer Systems		
<i>Objectives</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(a) define a computer system (b) describe the importance of computer systems in the modern world (c) explain the need for reliability in computer systems (d) explain the need for adherence to suitable professional standards in the development, use and maintenance of computer systems (e) explain the importance of ethical, environmental and legal considerations when creating computer systems	n/a	n/a

2.1.2 Computer Hardware		
The Central Processing Unit (CPU)		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(a) state the purpose of the CPU (b) describe the function of the CPU as fetching and executing instructions stored in memory (c) explain how common characteristics of CPUs such as clock speed, cache size and number of cores affect their performance.	Windows Server Administration Fundamentals: MTA Exam 98-372 <ul style="list-style-type: none"> Lesson 1 “Server Overview” 	n/a
Binary Logic		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>

(d) explain why data is represented in computer systems in binary form (e) understand and produce simple logic diagrams using the operations NOT, AND and OR (f) produce a truth table from a given logic diagram.	n/a	n/a
Memory		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(g) describe the difference between RAM and ROM (h) explain the need for ROM in a computer system (i) describe the purpose of RAM in a computer system (j) explain how the amount of RAM in a personal computer affects the performance of the computer (k) explain the need for virtual memory (l) describe cache memory (m) describe flash memory (n) discuss how changes in memory technologies are leading to innovative computer designs.	Windows Server Administration Fundamentals: MTA Exam 98-372 <ul style="list-style-type: none"> Lesson 1 “Server Overview” 	n/a
Input and Output Devices		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(o) understand the need for input and output devices (p) describe suitable input devices for a wide range of computer controlled situations (q) describe suitable output devices for a wide range of computer controlled situations	Windows Operating Systems Fundamentals: MTA Exam 98-349 <ul style="list-style-type: none"> Lesson 5 “Managing Devices” 	n/a

(r) discuss input and output devices for users with specific needs.		
Secondary Storage		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(s) explain the need for secondary storage (t) describe common storage technologies such as optical, magnetic and solid state (u) select suitable storage devices and storage media for a given application and justify their choice using characteristics such as capacity, speed, portability, durability and reliability.	Windows Operating Systems Fundamentals: MTA Exam 98-349 <ul style="list-style-type: none"> Lesson 5 “Managing Devices” Windows Server Administration Fundamentals: MTA Exam 98-372 <ul style="list-style-type: none"> Lesson 3 “Managing Storage” 	n/a

2.1.3 Software		
Software		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
<p>(a) explain the need for the following functions of an operating system: user interface, memory management, peripheral management, multi-tasking and security</p> <p>(b) describe the purpose and use of common utility programs for computer security (antivirus, spyware protection and firewalls), disk organisation (formatting, file transfer, and defragmentation), and system maintenance (system information and diagnosis, system cleanup tools, automatic updating)</p> <p>(c) discuss the relative merits of custom written, off the shelf, open source and proprietary software.</p>	<p>Windows Operating Systems Fundamentals: MTA Exam 98-349</p> <ul style="list-style-type: none"> Lesson 7 “Maintaining, Updating, and Protecting Windows 7” <p>Windows Server Administration Fundamentals: MTA Exam 98-372</p> <ul style="list-style-type: none"> Lesson 3 “Managing Storage” 	n/a

2.1.4 Representation of Data in Computer Systems		
Units		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
<p>(a) define the terms bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte</p> <p>(b) understand that data needs to be converted into a binary format to be processed by a computer.</p>	n/a	n/a
Number		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>

(c) convert positive denary whole numbers (0-255) into 8-bit binary numbers and vice versa (d) add two 8-bit binary integers and explain overflow errors which may occur (e) convert positive denary whole numbers (0-255) into 2-digit hexadecimal numbers and vice versa (f) convert between binary and hexadecimal equivalents of the same number (g) explain the use of hexadecimal numbers to represent binary numbers.	n/a	n/a
Character		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(h) explain the use of binary codes to represent characters (i) explain the term character set (j) describe with examples (for example ASCII and Unicode) the relationship between the number of bits per character in a character set and the number of characters which can be represented.	n/a	n/a
Images		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(k) explain the representation of an image as a series of pixels represented in binary (l) explain the need for metadata to be included in the file such as height, width and colour depth (m) discuss the effect of colour depth and resolution on the size of an image file.	n/a	n/a
Sound		

<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(n) explain how sound can be sampled and stored in digital form (o) explain how sampling intervals	n/a	n/a
Instructions		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(p) explain how instructions are coded as bit patterns (q) explain how the computer distinguishes between instructions and data.	n/a	n/a

2.1.4 Databases		
The Database Concept		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(a) describe a database as a persistent organised store of data (b) explain the use of data handling software to create, maintain and interrogate a database.	Database Administration Fundamentals – MTA EXAM 98-364 <ul style="list-style-type: none"> Lesson 1 “Understanding Core Database Fundamentals” 	Software Development Fundamentals: <ul style="list-style-type: none"> Module 6 “Understand Databases”
The DBMS		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(c) describe how a DBMS allows the separation of data from applications and why this is desirable (d) describe the principal features of a DBMS and how they can be used to create customized data handling applications.	Database Administration Fundamentals – MTA EXAM 98-364 <ul style="list-style-type: none"> Lesson 1 “Understanding Core Database Fundamentals” 	Software Development Fundamentals: <ul style="list-style-type: none"> Module 6 “Understand Databases”
Relational Databases		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(e) understand the relationship between entities and tables	Database Administration Fundamentals – MTA EXAM 98-364	Software Development Fundamentals: <ul style="list-style-type: none"> Module 6 “Understand Databases”

<p>(f) understand the components of a relational database, such as tables, forms, queries, reports and modules</p> <p>(g) understand the use of logical operators in framing database queries</p> <p>(h) explain the use of key fields to connect tables and avoid data redundancy</p> <p>(i) describe methods of validating data as it is input.</p>	<ul style="list-style-type: none"> • Lesson 1 “Understanding Core Database Fundamentals” • Lesson 5 “Administering a Database” 	
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2.1.6 Computer Communications and Networking		
Networks		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
<p>(a) explain the advantages of networking stand-alone computers into a local area network</p> <p>(b) describe the hardware needed to connect stand-alone computers into a local area network, including hub/switches, wireless access points</p> <p>(c) explain the different roles of computers in a client-server and a peer-to-peer network</p> <p>(d) describe, using diagrams or otherwise, the ring, bus and star network topologies</p> <p>(e) describe the differences between a local area network and a wide area network such as the internet</p> <p>(f) explain the terms IP addressing, MAC addressing, packet and protocols</p> <p>(g) explain the need for security measures in networks, such as user access levels, suitable passwords and encryption techniques</p>	<p>Networking Fundamentals: MTA Exam 98-366</p> <ul style="list-style-type: none"> • Lesson 1 “Understanding Local Area Networking” • Lesson 2 “Defining Networks with the OSI Model” • Lesson 3 “Understanding Wired and Wireless Networks” • Lesson 4 “Understanding Internet Protocol” • Lesson 5 “Implementing TCP/IP in the Command Line” • Lesson 6 “Working with Networking Services” • Lesson 7 “Understanding Wide Area Networks” • Lesson 8 “Defining Network Infrastructures and Security” 	<p>Networking Fundamentals:</p> <ul style="list-style-type: none"> • Module 1 “Understanding Local Area Networking” • Module 2 “Defining Networks with the OSI Model” • Module 3 “Understanding Wired and Wireless Networks” • Module 4 “Understanding Internet Protocol” • Module 5 “Implementing TCP/IP in the Command Line” • Module 6 “Working with Networking Services” • Module 7 “Understanding Wide Area Networks” • Module 8 “Defining Network Infrastructures and Security”

(h) describe and justify network policies such as acceptable use, disaster recovery, failover, back up, archiving.		
The Internet		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(i) describe the nature of the internet as a worldwide collection of computer networks (j) describe the hardware needed to connect to the internet including modems, routers (k) explain the need for IP addressing of resources on the internet and how this can be facilitated by the role of DNS services (l) explain the importance of HTML and its derivatives as a standard for the creation of web pages (m) describe common file standards associated with the internet such as JPG, GIF, PDF, MP3, MPEG (n) explain the importance of compressing files that are transmitted via the internet (o) describe the differences between lossy and lossless compression.	Networking Fundamentals: MTA Exam 98-366 <ul style="list-style-type: none"> Lesson 4 “Understanding Internet Protocol” Web Development Fundamentals – MTA EXAM 98-363 <ul style="list-style-type: none"> Lesson 1 “Creating a Web Page” Software Development Fundamentals – MTA EXAM 98-361 <ul style="list-style-type: none"> Lesson 4 “Understanding Web Applications” 	Networking Fundamentals: <ul style="list-style-type: none"> Module 4 “Understanding Internet Protocol” Software Development Fundamentals: <ul style="list-style-type: none"> Module 4 “Web Applications”

7. Programming		
Algorithms		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(a) understand algorithms (written in pseudocode or flow diagram), explain what they do, and correct or complete them (b) produce algorithms in pseudocode or flow diagrams to solve problems.	Software Development Fundamentals – MTA EXAM 98-361 <ul style="list-style-type: none"> Lesson 1 “Introduction to Programming” 	Software Development Fundamentals: <ul style="list-style-type: none"> Module 1 “General Software Development” Module 2 “Core Programming” Module 3 “Object-Oriented Programming”

		<ul style="list-style-type: none"> Module 4 “Web Applications” Module 5 “Desktop Applications”
Programming Languages		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(c) explain the difference between high level code and machine code (d) explain the need for translators to convert high level code to machine code (e) describe the characteristics of an assembler, a compiler and an interpreter (f) describe common tools and facilities available in an integrated development environment (IDE): editors, error diagnostics, run-time environment, translators, auto-documentation.	Software Development Fundamentals – MTA EXAM 98-361 <ul style="list-style-type: none"> Lesson 1 “Introduction to Programming” Microsoft.NET Fundamentals: MTA EXAM 98-372 <ul style="list-style-type: none"> Lesson 4 “Understanding Code Compilation and Deployment” 	Software Development Fundamentals: <ul style="list-style-type: none"> Module 1 “General Software Development” Module 2 “Core Programming” Module 3 “Object-Oriented Programming” Module 4 “Web Applications” Module 5 “Desktop Applications”
Control Flow in Imperative Languages		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(g) understand and use sequence in an algorithm (h) understand and use selection in an algorithm (IF and CASE statements) (i) understand and use iteration in an algorithm (FOR, WHILE and REPEAT loops).	Software Development Fundamentals – MTA EXAM 98-361 <ul style="list-style-type: none"> Lesson 1 “Introduction to Programming” Lesson 2 “Introduction to Object Oriented Programming” Lesson 3 “Understanding General Software Development” Lesson 4 “Understanding Web Applications” Lesson 5 “Understanding Desktop Applications” 	Software Development Fundamentals: <ul style="list-style-type: none"> Module 1 “General Software Development” Module 2 “Core Programming” Module 3 “Object-Oriented Programming” Module 4 “Web Applications” Module 5 “Desktop Applications”
Handling Data in algorithms		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(j) define the terms variable and constant as used in an imperative language (k) use variables and constants	Software Development Fundamentals – MTA EXAM 98-361 <ul style="list-style-type: none"> Lesson 1 “Introduction to Programming” 	Software Development Fundamentals: <ul style="list-style-type: none"> Module 1 “General Software Development” Module 2 “Core Programming”

(l) describe the data types integer, real, Boolean, character and string (m) select and justify appropriate data types for a given program (n) perform common operations on numeric and Boolean data (o) use one-dimensional arrays.	<ul style="list-style-type: none"> Lesson 2 “Introduction to Object Oriented Programming” Lesson 3 “Understanding General Software Development” Lesson 4 “Understanding Web Applications” Lesson 5 “Understanding Desktop Applications” 	<ul style="list-style-type: none"> Module 3 “Object-Oriented Programming” Module 4 “Web Applications” Module 5 “Desktop Applications”
Testing		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(p) describe syntax errors and logic errors which may occur while developing a program (q) understand and identify syntax and logic errors (r) select and justify test data for a program, stating the expected outcome of each test.	Software Development Fundamentals – MTA EXAM 98-361 <ul style="list-style-type: none"> Lesson 3 “Understanding General Software Development” 	Software Testing with Visual Studio 2012 <ul style="list-style-type: none"> Lesson 1 “Overview and Create and Configure Test Plans (Part 1)”

2.2.1 Practical Activity		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(a) plan and carry out a practical investigation of a topic (b) use practical skills effectively and efficiently to develop solutions to problems (c) test their solutions (d) evaluate and modify these solutions in light of test results.	n/a	n/a

2.2.2 Effectiveness and Efficiency		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(a) select suitable techniques for the development of their solution (b) use suitable techniques to solve all aspects of	n/a	n/a

the problem (c) deploy practical techniques in an efficient and logical manner.		
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2.2.3 Technical Understanding		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(a) show an understanding of the relevant information by presenting evidence of the development of their solutions (b) show an understanding of the technical terminology/concepts that arise from their investigation through their analysis of the data collected (c) use the terminology/concepts surrounding their topic and contained in the information collected, correctly when it comes to producing their analysis in the supporting script.	n/a	n/a

2.2.4 Testing, Evaluation, and Conclusion		
<i>Objective</i>	<i>MOAC course and lesson(s)</i>	<i>MVA course and module(s)</i>
(a) produce a full report covering all aspects of the investigation (b) present the information in a clear form which is understandable by a third party and which is easily navigable (c) critically appraise the evidence that they have presented (d) test their own solution (e) present their evaluation in a relevant, clear, organised, structured and coherent format	n/a	n/a

<p>(f) use specialist terms correctly and appropriately</p> <p>(g) present a conclusion to the report</p> <p>(h) justify their conclusions based on the evidence provided.</p>		
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