# Module 2 / Unit 1 / Using Data Types and Units

**1) Which notation system supports presenting the largest numbers using the fewest digits: Binary, Decimal, or Hexadecimal?**

Hexadecimal. Each hex digit can store 16 bits of information. A single decimal digit stores 4 bits while binary obviously stores 1 bit.

**2) What is the decimal number 75 in binary and hexadecimal?**

0100 1011 in binary and 4B in hex. Hex notation is often indicated using 0x to precede the hex digits, so you may see this written like 0x4b. To work out the answer without a calculator, write out the place values for each notation system. For binary you'd have columns for 64, 32, 16, 8, 4, 2, and 1 and put a 1 in each column you need to add up to 75 and a 0 in the others. For hex you only need 16 and 1 (75 divided by 16 is 4 remainder 11, which is represented as "B" in hex).

**3) Which data type provides for whole numbers only?**

Integer

**4) What is the difference between the char and string data types?**

Char stores a single textual character in a fixed length field (typically 1 byte). A string is a variable length field for storing a sequence of characters.

**5) Which data representation format can encode the widest range of characters?**

Unicode can represent millions of characters (glyphs). ASCII's 7-bit data structure can only support 128 characters, some of which are non-printable control characters.

**6) What type of legal protection could be obtained for a novel software algorithm?**

Patent provides the best protection as it can enforce ownership even if someone tries to write the algorithm in a slightly different way. Software code is often protected both by patent and by copyright however.

**7) What data protection technology could you implement in order to restrict the type of activity that users could employ on digital products that they have purchased or rented?**

Digital Rights Management (DRM).

**8) What part of the process of data analytics is most closely supported by meaningful reporting?**

Insights are the "end product" of the analytic process. Humans need a suitable reporting format to make best use of insights.

## Module 2 / Unit 2 / Using Apps

1. **What compatibility information should you confirm before installing a software application?**

That it works with the version of Windows that you have and that your computer meets the

system (hardware) requirements.

1. **Following installation of a program written for an older version of Windows, you receive an alert that it might not have installed correctly. What feature could you use to make the program run correctly?**

Use the program's Compatibility tab to use settings for the older Windows version.

1. **Why would Windows prompt you to enter a password if you try to install a software application?**

Installing an application requires administrator privileges and is an action protected by User

Account Control. If you were logged on as an administrator already, you might have to enter

the password on a domain; if you were logged on as an ordinary user, you would have to enter the administrator's user name and password.

1. **Windows comes with web server software but it is not enabled by default. How would you install this software?**

Use the Turn Windows features on or off dialog from Programs and Features.

1. **Following installation of an application, another program on your computer has stopped working. What could you do to try to fix it?**

Try using the Repair option in Programs and Features (if available) or re-installing the program.

1. **Why might one of your first tasks on receiving a new computer be to remove software applications?**

The computer may be bundled with pre-installed software that you do not want

1. **In order to obtain support, the software vendor wants to know the application's product ID. How would you locate this information?**

Usually via the Help > About menu.

1. **What is the difference between freeware and open source software?**

Open source means that the programming code used to design the software is also made

available (and you must make it available in turn if you sell or distribute any part of it).

Freeware means the software product costs nothing to use but this does not mean that the

code is made available too or that you could modify the software and distribute it yourself.

1. **What type of software would you use to configure a server by connecting to it over the network?**

Remote Desktop.

1. **What type of software manages tasks, dependencies, and timelines?**

Project management software.

#### Module 2 / Unit 3 / Programming and App Development

**1) What shows the structure of code without using the specific syntax of any one language?**

Pseudocode.

**2. What is an interpreted language?**

Interpreted languages do not need to be compiled. They run within the context of an interpreter which converts the code to machine code during runtime.

**3. How is a markup language differ from a compiled language?**

Markup doesn't provide instructions for the CPU to run as such. Markup is a way of using nested tags within a document to describe its structure and contents.

**4. What are constants and variables examples of?**

Programming identifiers.

**5. What type of programming concept allows for a variable size container?**

A vector is a variable size container while an array is a fixed size one.

**6. You want to check whether a condition has been met, and if it has, perform one action.**

**Otherwise, you want your program to perform a second action. What sort of programming**

**operation would help achieve this?**

A conditional branch, such as an If…Then statement.

**7. In a program, what does a loop do?**

A loop performs one or more instructions until (or while) a condition is met.

**8. What is the difference between a procedure and a function?**

A procedure does something while a function does something and then returns a value to the main program.

**9. What three things define an object?**

Properties, attributes, and methods.

**10. What three scripting options are commonly used in Windows 10 to perform administrative**

**tasks?**

Batch files, Windows PowerShell scripts, and VBScripts.

**11. True or false? You do not need to install a web application to your computer; it would be**

**accessed via a browser.**

True.

**12. What is the advantage of a local network hosted application, in terms of data storage?**

If data is stored on the server not on the local workstation, it is easier to apply access controls and to back it up.

### Module 2 / Unit 4 / Using Databases

**1. What are the structural elements of a database table?**

Each table stores information about records (rows in the table) in fields (columns in the tables).

**2. What term is used to describe selecting and viewing information in a database?**

Query.

**3. How does an RDBMS such as Microsoft SQL Server differ from Microsoft Excel when used to**

**store a dataset?**

Excel is an example of a flat file system. These do not scale well, and usually support a single user only. RDBMS platforms enable many hundreds or thousands of users to connect concurrently, and can support very large datasets. Also, an RDBMS can enforce data types for each column and validate information entered as fields and records.

**4. What language is usually used to request data from an RDBMS such as Oracle?**

Structured Query Language (SQL) is used to query RDBMS-based database platforms.

**5. What is it that defines the relationship between tables in an RDBMS?**

Each table contains a primary key whose value is unique for each record in the table. A foreign table can use the value of a primary key as a relation, storing the value in a foreign key field.

**6. Give an example of unstructured data.**

Images and text files and other document formats are unstructured data.

**7. Give two examples of semi-structured data stores.**

Key/value pair databases and markup language document stores.

**8. Is an INSERT statement an example of a definition or manipulation language statement?**

Manipulation language—it depends on the structure of a table (columns, data types, and constraints) being established already.

**9. You need a development environment with a library of database functions. What type of**

**interface are you using?**

Programmatic access.

**10. How can a client-server application architecture be described if there is the potential for the**

**structure of the application platform to be developed further?**

This could be described as a two-tier application. It could be re-developed as a three-tier application by specifying presentation, application, and data layers.