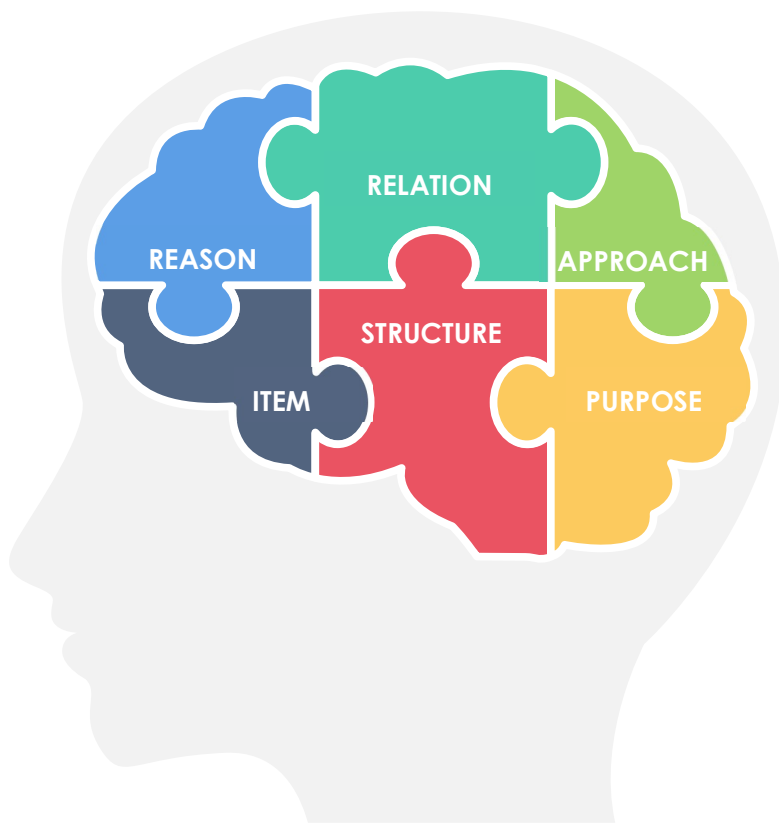


# SIMPLIFIED BLOCK MODEL OF PROGRAM COMPREHENSION

---

The investigate stage of Craig'n'Dave T.I.M.E. programming resources also includes progressive program comprehension questions based on a simplified student-friendly version of the block model proposed by Carsten Schulte. Questions provide students with an opportunity to consider what programming terms mean, what commands or blocks of code achieve, how they work and why they are used. A deeper knowledge of syntax and programming constructs allows students to adapt to new commands more easily.

Each question is based on one of Craig'n'Dave's six pillars of program comprehension.



---

## ITEM

Programming terminology and keywords.

---

## STRUCTURE

Syntax of lines and blocks of code.

---

## PURPOSE

What the item or structure achieves, returns, or outputs.

---

## REASON

The reason why an item or structure is used.

---

## RELATION

How items or structures relate to each other. The wider implication for the program or computer system.

---

## APPROACH

How a section of code can be modified to achieve a greater purpose.

---

Item, structure and purpose are lower order questions. Reason, relation and approach are higher order questions.



## Program comprehension questions

<p><b>ITEM</b></p>	<p>Programming terminology and keywords. Delimiter, qualifier, identifier, literal, operator, variable, constant, reserved word etc.</p>	<p>Q: In the command <code>print("hello world")</code> what is hello world known as? A: String.</p> <p>Q: In the command <code>print("hello world")</code> identify the string. A: hello world.</p>
<p><b>STRUCTURE</b></p>	<p>Identifying a block of code, syntax of an item or providing an example of a line of code.</p>	<p>Q: What character is used to identify (or qualify) the start and end of a string? A: double quote (sometimes a single quote).</p>
<p><b>PURPOSE</b></p>	<p>What the item or structure achieves, returns or outputs.</p>	<p>Q: What does the command <code>print("hello world")</code> do? A: Prints the words hello world to the screen.</p>
<p><b>REASON</b></p>	<p>Why an item or structure is used.</p>	<p>Q: Explain why the <code>"</code> character must be used. A: Without a string qualifier the compiler will assume hello is a variable, generating a syntax error.</p>
<p><b>RELATION</b></p>	<p>How items or structures relate to each other and the wider implication for the program or computer system.</p>	<p>Q: What are the advantages and disadvantages of using the command <code>print("hello world")</code> instead of using: <code>txt = "hello world" : print(txt)</code> A: There are less FDE cycles used but the string cannot be used later with other commands because it is not stored in memory.</p> <p>Q: What is the implication of changing the order of the commands to: <code>print(txt) : txt = "hello world"</code> A: Whatever is currently stored in txt will be output or an error may occur.</p>
<p><b>APPROACH</b></p>	<p>How a section of code can be modified to achieve a greater purpose.</p>	<p>Q: Explain how the string can be sanitised to eliminate any spaces. A: By using a loop to iterate over each character in the string, concatenating it to a new string if it is not a space.</p>

