

1.2 SOFTWARE & SOFTWARE DEVELOPMENT · 1.2.4

Programming paradigms & procedural languages — Mark scheme

32 marks · spec 1.2.4(a)(b)

AO key: AO1 = knowledge & understanding · AO2 = application · AO3 = design/program & reasoned judgements. Accept any valid alternative; do not award the same point twice.

Q	ANSWER	AO	MARKS
1(a)	A style / approach to structuring and writing programs. (1)	AO1	1
1(b)	1 mark each, max 3: procedural / object-oriented / declarative (functional, logic) / low-level (assembly). (3)	AO1	3

Q	ANSWER	AO	MARKS
2(a)	2 characteristics × (point + development), max 4, e.g.: • instructions execute in sequence (1) with selection and iteration controlling flow (1) • decomposed into procedures/functions (1) that are reusable / called when needed (1) • data is separate from procedures and passed as parameters (1)	AO1	4
2(b)	1 mark each, max 2: C / Pascal / Python / BASIC, etc. (2)	AO1	2

Q	ANSWER	AO	MARKS
3(a)	1 mark per point, max 3: • different problems are solved most naturally in different styles (1) • levels of abstraction trade ease of writing against control of hardware (1) • valid example pairing a paradigm with a problem type (1)	AO1	3
3(b)	A step-by-step task (e.g. a calculation / batch file processing) (1) because it maps directly onto a sequence of instructions (1). (2)	AO2	2

Q	ANSWER (INDICATIVE)	AO	MARKS
4	<pre> a = input("Enter the first number") b = input("Enter the second number") if b == 0 then print("Cannot divide by zero") else print(a / b) endif </pre> 1 mark each, max 4: both inputs (1); correct test for zero (1); correct message in the zero case (1); correct division and output otherwise (1).	AO3	4

Q	ANSWER	AO	MARKS
5(a)	A named block of code (procedure/function) that performs a task and can be called when needed. (1)	AO1	1
5(b)	2 benefits × (point + development), max 4, e.g.: - code is reusable (1) — written once, called many times (1) - easier to test/debug (1) — each subroutine can be checked in isolation (1) - easier to read / share among a team (1)	AO2	4

Q	LEVELS-OF-RESPONSE MARK SCHEME	AO	MARKS										
6	Mark using the levels descriptors below. AO1 (knowledge of paradigms), AO2 (application via examples), AO3 (justified judgement). <table><tr><th>LEVEL</th><th>DESCRIPTOR</th></tr><tr><td>Level 3 (7–8)</td><td>Clear discussion of why paradigms exist, accurately characterising procedural and another paradigm, with a justified example of where procedural is the best choice. Well structured.</td></tr><tr><td>Level 2 (4–6)</td><td>Describes two paradigms with some reasoning about why both exist; justification of the procedural example may be partial.</td></tr><tr><td>Level 1 (1–3)</td><td>Basic points about one or more paradigms with little reasoning or justification.</td></tr><tr><td>0</td><td>Nothing creditworthy.</td></tr></table> Indicative content (credit any valid point): • Paradigms exist because problems differ (sequential tasks vs systems of interacting objects vs querying data) and abstraction trades ease against control. • Procedural: step-by-step, subroutines, data passed as parameters; ideal for clear sequences (calculations, batch processing). • Contrast paradigm, e.g. OOP (objects combine data and behaviour; suits large systems with many similar entities) or declarative (state what, e.g. SQL queries). • Justified example, e.g. a payroll calculation runs the same steps over each record, so a procedural program is simple, fast and easy to follow.	LEVEL	DESCRIPTOR	Level 3 (7–8)	Clear discussion of why paradigms exist, accurately characterising procedural and another paradigm, with a justified example of where procedural is the best choice. Well structured.	Level 2 (4–6)	Describes two paradigms with some reasoning about why both exist; justification of the procedural example may be partial.	Level 1 (1–3)	Basic points about one or more paradigms with little reasoning or justification.	0	Nothing creditworthy.	AO1 ×3 AO2 ×3 AO3 ×2	8
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Total for paper: 32 marks