Sequencing, decisions and repetition

Key knowledge | Free preview

Learning target: Understand how ordered operations, branches and loops control technological algorithms and simulations.

An implemented algorithm relies on correctly ordered instructions, decisions and repetition. Initialisation establishes a valid starting state; branches choose the next action; a stopping rule connects the process to an accuracy target. Trace several steps before trusting a full run, and record a limit or error condition so a failed calculation does not silently continue.

Try the mathematics

Task 1. Implement the following bisection outline for $f(x)=x^3-2$ and explain the purpose of its initialisation, decision and repetition: Set $L=1, H=2$. Check $f(L)f(H)<0$. Repeat: $M=(L+H)/2$; if $f(M)=0$, return M; otherwise if $f(L)f(M)<0$ set $H=M$, else set $L=M$. Stop when $(H-L)/2 \leq 0.0005$ and return $(L+H)/2$. Retain a maximum-iteration guard.

Continue with the full worksheet

The complete resource has 2 focused task sets and substantive worked solutions. Use an exercise book or print the A4 worksheet. This preview shows the first task without its full solution.

Find this resource: https://resources.aspiretopowerlearning.com.au/vce/skills/aspire-mm-u1-o3-kk-07/

Study-design reference

VCE Mathematics Study Design 2023-2027, version 1.1 (November 2022). Mathematical Methods; Unit 1; Outcome 3; Key knowledge; bullet 7; p. 48.

The learning target is a concise paraphrase. Aspire reference: aspire-mm-u1-o3-kk-07. This is an internal identifier, not an official VCAA code.

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