

## IB Computer Science: IA Guide

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For the Computer Science IA, you are expected to demonstrate the practical application of skills learned during the course. This is done by developing a product and preparing documentation for your product/solution.

The word limit on the IA is 2000 words, excluding the Bibliography, Footnotes, and Appendices.

The components of your Computer Science IA are:

- A cover page
- The fully-functional product
- Documentation which includes a 7 minute video

Five criteria are assessed, each dealing with a particular aspect of your investigation. The five criteria are:

- Planning
- Solution overview
- Development
- Functionality and extensibility of the product
- Evaluation

A few essentials to keep in mind before beginning your IA process:

- The objective of the Internal Assessment is to develop a solution for a specific client for a particular problem.
  - Some investigation-specific terminology you should know:
    - Solution – all-encompassing work submitted as the IA
    - Product – the software developed; a part of the solution
    - Developer/Student – one who proposes and implements the solution
    - Client – for whom the product is developed
    - Advisor – a mentor/third party referred to for guidance.
  - Select a challenging topic that interests you. Make sure the solution you propose and present documents your algorithmic and organizational skills.
  - DO NOT:
    - Develop a product by copying code found elsewhere
    - Rip off a web-based template for your website (product)
    - Use any other existing unmodified software
  - The more you include graphical representation in your IA, the better. Visual content (tables, screenshots, diagrams, charts, etc.) will give your work credibility and add clarity. You don't have to narrate a story through words; you have to propose a plausible solution with the needed requisites to back it up.
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## Finding the Right Client

This is an important stage of your IA process. Approach your parents, teachers, or relatives as the first option, but an acquaintance or someone running a business can also be approached. Becoming a client for your own IA may not be the best idea. Communicate all your options with your advisor before settling on a client.

- Be sure you understand your client's needs and think about how you can contribute to their needs.
  - Discuss the criteria for work and obtain consent for the personal use of data before you start working.
  - Maintain confidentiality where required and be responsible for sensitive data.
  - Schedule at least two interviews with your client. The preliminary one is to assess the need and feasibility of the product, and the secondary is to consult with the client on the rationale and success criteria you come up with. You are supposed to move ahead only when they give you approval on the success criteria of the final product. You must attach the transcripts of the interviews in the appendix and refer to them in the main text.
  - Get feedback and your solution evaluated after you hand it over to the client for use.
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## Choosing a Topic

Your IB Computer Science IA topic should be of appropriate complexity and explicitly demonstrate your algorithmic and organizational thinking. Your work should show your computational thinking. Your solution can be in the form of:

- Creating a new system, such as an OOP program, a relational database, a simulation, or a stand-alone/ web-based application
- Adding functionality to an existing system, such as connecting a webpage(s) to a database, writing a plug-in, or developing a stand-alone application

In case of an addition, modification/improvement to an existing work, clearly highlight the work done by you. Also, steer clear of copying available code.

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## Breaking down the Computer Science IA solution

- Product: A fully functional product must be developed whose access must be given to the moderator. A video of the product in use must be handed in as well.
- Documentation: This is the supporting content/documentation included in the 2000 word limit and includes:
  - Record of Tasks
  - Any form of extended writing for Design, Development

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## Organization of your documentation based on the assessment criteria

### Criterion A: Planning

The three document components that must be included for the Planning criteria are:

- The Scenario
  - Document - Description of the Scenario
  - Estimated Word Count - (175-250)
  - Format - Extended Writing
  - This component deals with defining the problem statement. Justifications on why the particular client was chosen and the need for the product are dealt with here.
- Rationale for the Solution
  - Document - Justification for the proposed product
  - Estimated Word Count - (175-250)
  - Format - Extended Writing Here you state why the proposed solution will be effective for your particular use case. Always consult your client and adviser and justify your choice of the technology stack.
- Success Criteria
  - Document - Success Criteria for your final product
  - Format - Bulleted List
  - These are the specific criteria against which your final product is evaluated.

### Criterion B: Solution Overview

The two document components that must be included for the Solution Overview criteria are:

- Record of Tasks
  - Document - Record of Tasks
  - Format - Record of tasks form template as provided by the IB
  - The record tasks include:
    - a chronology of the critical events in the planning, designing, developing, testing, and implementing of the solution
    - any other issues that may arise that may affect the development of the solution.
- Design Overview
  - Document - Design Overview
  - Format - Document including diagrams, tables, scanned sketches, flowcharts, screenshots, pseudocode, or any other diagrammatic representation
  - The Design Overview comprises:
    - design methodologies appropriate to the type of product being designed

- different levels of the draft design, such as the overall structure and the internal layout of the product itself; this can also include the investigation into specific elements used within the product (such as classes, sub-classes, tables, queries, style sheets, graphic elements, effects)
- evidence of a testing plan that addresses the main areas of functionality of the product.

### **Criterion C: Development**

- Document - Developing the Product
- Estimated Word Count - (500-1000)
- Format - Extended Writing (inclusive of screenshots as evidence and reasoning for the techniques you chose to use)

Be sure to list the techniques you chose to use in this document including: algorithmic thinking, data structures, software tools, and user interface. Give a detailed account of your algorithmic thinking and include reference material. Your product code can be given in the appendix.

### **Criterion D: Functionality and extensibility of product**

The two components for this criteria are:

- Functionality of the product
  - Estimated duration - 2-7 minutes, 5 minutes recommended
  - Format - Video for evidence of functionality (MP4 format)
  - While demonstrating the functionality of your product and explaining its features, cover the success criteria the product has managed to achieve. Do not forget to discuss how the program can be extended and its future scope. If needed, documents including screenshots showing the product functioning should be included in the documentation folder with information on how to access it on the cover page.
- Extensibility of the product
  - This is assessed from the **Design Overview** and **Development of the Product** sections of your solution.

### **Criterion E: Evaluation**

The two components for this criteria are:

- Evaluation of the product
  - Document - Evaluating the product
  - Estimated Word Count - (175-250)
  - Format - Extended Writing
  - Evaluation of the product against the success criteria listed should be done both on the client and the developer's end.

- Recommendations for the future development of the product
    - Document - Recommendations for improving the product
    - Estimated Word Count - (175-250)
    - Format- Extended Writing
  - Discuss possible improvements for the product and their corresponding benefits.
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## IA Topics Reference List

Here is a list of some general IB Computer Science IA topics to think about:

1. An application to help a client organize and manage a regular event
2. An application to help book a room/lodging
3. A simple and efficient inventory management system
4. An interactive game application
5. An application used as a budgeting tool
6. An application for file backup
7. A web-based program to schedule/manage personal fitness goals.
8. A web application to schedule regular client appointments at a dentist's clinic
9. A PHP text-based game
10. A program for sorting products for a client
11. Using Google Calendar API scheduling meetings/workshops
12. An educational game using Pygame that makes learning fun
13. A web-based logging framework
14. A functional database for a school
15. A functional database to keep track of one's investment portfolio (stock market investments)
16. A program to keep track of books in a public library, whether borrowed, available, or missing.
17. A Python script used to develop a network analysis tool that helps users clearly understand what might be wrong with a network connection application snooper
18. A functional database for an airline to keep track of its flights and respective fares to perform proper analytics to maximize profit.
19. A programmed simulation to model various physics experiments
20. A web program to help students understand what school they might be accepted to with their GPA
21. An application that acts as a medication tracker to assist diagnosticians and patients alike
22. An application to manage screen-time
23. A sorting program for a retail business
24. A functional database for a real estate agent to keep a record of client information
25. An interactive problem-solving game, for example, Chess.
26. An application that tracks all your TV shows
27. An easy-to-use homework management application

27. An application to be used for a hospital management system

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## RESOURCES

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### Topic Ideas

[CS 50 Final Projects](#)

### Guides and Checklists:

[Computer Science IA](#) by Paul Baumgarten

[Computer Science IA Checklist](#)

[IB Computer Science Checklist](#)

[IB CS IA Solution Guide](#)

[IB CS IA Solution \(BC School\)](#)

### Criterion A:

[Criterion A](#) (1)

[Criterion A](#) (2)

### Solution Examples:

[IA Solution Ideas and Examples](#)

[IB Computer Science IA Video \(1\)](#)

[IB Computer Science IA Video \(2\)](#)

### IA Examples

[Criterion A](#)

[Criterion B: Record of Tasks](#)

[Criterion B: Design](#)

[Criterion C](#)

[Submitting the IA](#)

### Programming the IA

[Python GUI Programming with Tkinter](#)

[Object Oriented Programming in Python](#)