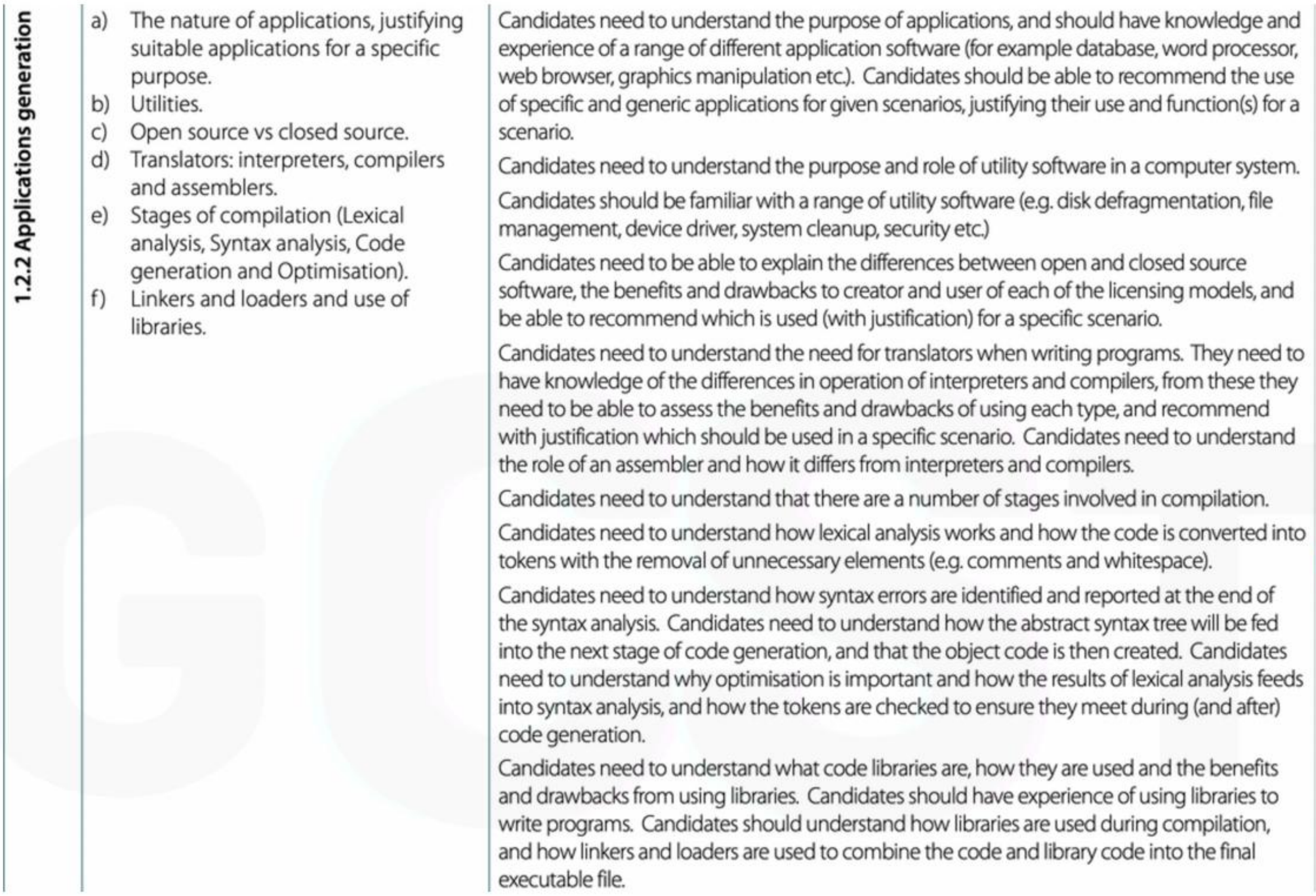
GCST

1.2.2
APPLICATIONS GENERATION
TOPIC WISE EXAM QUESTIONS

A-LEVEL OCR



1.2.2 Applications generation	a) The nature of applications, justifying suitable applications for a specific purpose. b) Utilities. c) Open source vs closed source. d) Translators: interpreters, compilers and assemblers. e) Stages of compilation (Lexical analysis, Syntax analysis, Code generation and Optimisation). f) Linkers and loaders and use of libraries.	Candidates need to understand the purpose of applications, and should have knowledge and experience of a range of different application software (for example database, word processor, web browser, graphics manipulation etc.). Candidates should be able to recommend the use of specific and generic applications for given scenarios, justifying their use and function(s) for a scenario. Candidates need to understand the purpose and role of utility software in a computer system. Candidates should be familiar with a range of utility software (e.g. disk defragmentation, file management, device driver, system cleanup, security etc.) Candidates need to be able to explain the differences between open and closed source software, the benefits and drawbacks to creator and user of each of the licensing models, and be able to recommend which is used (with justification) for a specific scenario. Candidates need to understand the need for translators when writing programs. They need to have knowledge of the differences in operation of interpreters and compilers, from these they need to be able to assess the benefits and drawbacks of using each type, and recommend with justification which should be used in a specific scenario. Candidates need to understand the role of an assembler and how it differs from interpreters and compilers. Candidates need to understand that there are a number of stages involved in compilation. Candidates need to understand how lexical analysis works and how the code is converted into tokens with the removal of unnecessary elements (e.g. comments and whitespace). Candidates need to understand how syntax errors are identified and reported at the end of the syntax analysis. Candidates need to understand how the abstract syntax tree will be fed into the next stage of code generation, and that the object code is then created. Candidates need to understand why optimisation is important and how the results of lexical analysis feeds into syntax analysis, and how the tokens are checked to ensure they meet during (and after) code generation. Candidates need to understand what code libraries are, how they are used and the benefits and drawbacks from using libraries. Candidates should have experience of using libraries to write programs. Candidates should understand how libraries are used during compilation, and how linkers and loaders are used to combine the code and library code into the final executable file.

1 A small manufacturing business uses networked computers with closed source application software installed.

(a) A spreadsheet application package is used to calculate employee's wages.

(i) Give **one** benefit of using a spreadsheet application for this task compared to calculating wages manually.

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.... [1]

(ii) Give **two** other types of application packages that the small business could use, giving an example of a task that the business could use each application for.

Application 1 ....

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Example of task 1 ....

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Application 2 ....

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Example of task 2 ....

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[4]

(iii) Describe a drawback of using closed source software (rather than open source software) for the small business.

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.... [3]

5 A programmer creates this function shown in **Fig. 5** using a high-level language.

```
function mystery(x,y)
    total = x + y
    while x >= 10 then
        x = x - 10
        y = y - 10
        total = total + x + y
    endwhile
    return total
endfunction
```

Fig. 5

(b) Before the code in **Fig. 5** can be executed, a translator must be used.

(i) State the purpose of a translator.

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.... **[1]**

(ii) Explain **two** differences between a compiler and an interpreter.

Difference 1 ....

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Difference 2 ....

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[4]

(c) For each statement shown in **Table 5**, tick (✓) **one** box in each row to indicate which stage of compilation each action takes place at.

	Lexical analysis	**Syntax analysis**	**Code generation**
Comments and whitespace are removed			
Keywords are replaced with tokens			
Object code is created			
Symbol table created for variables			
Builds an abstract syntax tree			

Table 5

[5]

(d) Describe the purpose of code optimisation.

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.... **[2]**

2 Charlie owns a veterinary surgery in her local town. She has purchased a new computer for her business so she can complete her accounts, write letters to her customers and keep a record of her customers' personal and appointment details.

She intends to install application software and utility software.

(a) Charlie will install database application software on her computer.

State **one** additional type of application software Charlie could install and give an example of what she might use it for.

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.... **[2]**

(b) Charlie's computer has firewall utility software already installed.

Explain **two** other pieces of utility software that Charlie should install on her computer.

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[4]

(c)* Charlie will use database management software to store customers' personal and appointment details. Charlie is considering both open source and closed source database software.

Compare the differences between open source software and closed source software and recommend which type of database software Charlie should use.

You should refer to the following in your answer:

- Cost
- Usability
- Extensibility
- Security
- Support available

[9]

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Operating systems usually come with utility software pre-installed.

9 **(c)** Give **two** examples of utility software, explaining the purpose of both.

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[4]

(d) Imogen installs a compiler for a high-level programming language onto her computer and makes use of an open source IDE (Integrated Development Environment).

(i) State what is meant by the term 'open source software'.

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.... **[2]**

(ii) Give **one** benefit to Imogen of using an open source IDE rather than a closed source IDE.

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.... **[1]**

(e) When Imogen creates programs in a high-level language, she makes use of libraries.

(i) Explain what is meant by a library, giving **one** example of when one may be used.

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.... **[3]**

(ii) Describe **one** advantage of the use of library files to programmers.

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.... **[2]**

(iii) Describe **one** disadvantage of the use of library files to programmers.

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.... **[2]**

(iv) Explain how linkers are used during the compilation process.

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.... **[3]**

6 A company makes anti-virus software.

Anti-virus software is an example of a utility.

(a) Define the term ‘utility’.

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.... **[2]**

(b) State how an application differs from a utility.

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.... **[1]**

8 A simple program is shown below.

```
//Program to calculate number of times

//a number goes into 100

count = 0

num = int(input("Enter a number"))

while (count*num)<=100

        count=count+1

endwhile

count=count-1 //Take one off as gone over


print(str(num) + " goes into 100 " + str(count) + " times.")
```

Fig. 8.1

The program is compiled. The first stage is Lexical Analysis.

(f) Referring to examples in the code in Fig. 8.1, explain what happens in Lexical Analysis.

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.... **[3]**

(g) State the name of the stage of compilation that directly follows Lexical Analysis.

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.... **[1]**

1 Open source software has grown in popularity over the last few decades.

(a) Explain the difference between open source and closed source software.

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.... [4]

(b) Explain why all closed source software is most likely to be compiled rather than run on an interpreter.

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.... [2]

(c) State the name of a type of translator software other than a compiler or interpreter.

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.... [1]

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5 A software company is producing software that allows users with severe mobility issues to input data into a computer.

(c) The developer decides she wants to make the software program open source.

Explain the benefits to the users of the software being open source.

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.... [2]

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(d) The software team use a prebuilt library to create the Graphical User Interface.

(i) Give **two** advantages to the software team of using a library.

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2 ....

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[2]

(ii)* The program is compiled. Explain the process of compilation including how code from the library becomes part of the finished program, justifying why each stage is necessary.

[9]

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1. Livid Lizards is a computer game in which players get to fire lizards from a cannon to knock down walls. Players get to pick different types of lizards, each with qualities and special powers.

The game is coded using an object-oriented language. Below is the code for the lizard class:

```
class Lizard

    private speed
    private mass
    private size

    public procedure new(givenSpeed, givenMass, givenSize)
        speed=givenSpeed
        mass=givenMass
        size=givenSize
    endprocedure

    public function breakBlock(brick)
        if speed*mass>=brick.getStrength() then
            speed=((speed*mass)-brick.getStrength())/mass;
            return true
        else
            return false
        endif
    endfunction

    ...
    ...
    ...

endclass
```

The game uses a 2D graphics library. Explain why a linker would need to be used after compilation.

[3]

2. State **three** benefits of using library routines when a program is written.

1

2

3

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[3]

3. Describe what happens during syntax analysis, when code is compiled.

-- [5]

If you found this useful, drop a follow to help me out!

THANK YOU!

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