

## AS COMPUTER SCIENCE

Paper 1

June 2020

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### Preliminary Material

To be opened and issued to candidates on or after **1 March 2020** subject to the instructions given in the **Teachers' Notes** (7516/1/TN).

#### Note

- The **Preliminary Material**, **Skeleton Program** and **Data Files** are to be seen by candidates and their teachers **only**, for use during preparation for the examination on **Tuesday 19 May 2020**. They **cannot** be used by anyone else for any other purpose, other than that stated in the instructions issued, until after the examination date has passed. They must **not** be provided to third parties.

#### Information

- A Skeleton Program is provided separately by your teacher and must be read in conjunction with this Preliminary Material.
- You are advised to familiarise yourselves with the Preliminary Material and Skeleton Program before the examination.
- A copy of this Preliminary Material and the Skeleton Program will be made available to you in hard copy and electronically at the start of the examination.
- You must **not** take any copy of the Preliminary Material, Skeleton Program and Data Files or any other material into the examination room.

Candidates will need access to a text file editor, such as Notepad or TextEdit.

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## INSTRUCTIONS FOR CANDIDATES

The question paper is divided into **three** sections.

### Section A

You will be asked to create a new program and answer questions **not** related to the **Preliminary Material** or **Skeleton Program**.

### Section B

Questions will refer to the **Preliminary Material** and the **Skeleton Program**, but will not require programming.

### Section C

Questions will use the **Preliminary Material** and the **Skeleton Program** and may require the `ascii.txt`, `greyscale.txt`, `image1.txt`, `image2.txt` and `image3.txt` **Data Files**.

### Electronic Answer Document

Answers for **all** questions, for **all** sections, must be entered into the word-processed document made available to you at the start of the examination and referred to in the question paper rubrics as the **Electronic Answer Document**.

### Preparation for the Examination

You should ensure that you are familiar with this **Preliminary Material** and the **Skeleton Program** for your programming language.

## Graphics

The **Skeleton Program** accompanying this **Preliminary Material** is a simple graphics program that uses ASCII art.

ASCII art is a technique used to represent images using the 95 printable characters in the ASCII character set. ASCII art is used where text can be printed but bitmapped graphics cannot, for example in console mode programming environments. It requires monospaced fonts (such as `Courier New`) which position the characters neatly in columns.

Different techniques can be used in ASCII art for different effects. Here are some examples:

```

  ^_^
 ( @ @ )
 ( >o< )
  ~ ~ ~

```

```

#####
#
#  /\  /\  /\  #
#  /  \ /  \ /  \ #
#  /    \    \    \ #
#  /      \      \      \ #
#  /        \        \        \ #
#  /          \          \          \ #
#####

```

Very elaborate images have been made with different characters emulating different shades for the pixels.

**Figure 1** shows an ASCII art image loaded from the `image1.txt` data file.

**Figure 1**

```

      , ((/,
    (/ (#.      .,,, // (,*/*
    (*, #/(//, .//(((/.
    / (* (///////////#
    ///////////,
    (/////////#////////#
    (///# (////////#(///*,*
    #/////////#
    */// (/#,, (/ (/#/*, .
    #/#/// (%///# (///#///* ( .
    (//////////,,,*/// (
    .##//////////,,//,,/
    (//////////*,. .,///
    (//////////*,////////, (
    #//////////, . . . ,
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    *, #///# / (*, . . , *//////////, . #,
    #//#*, . . , // #//////////
    (/#//////// ( (//#////////#
  
```

The **Skeleton Program** uses printable ASCII characters to display images. The program allows the user to load an image from a text file. The option "S - Save image" saves the image in such a way that it can be viewed in a text editor, such as Notepad or TextEdit.

The **Skeleton Program** can also load greyscale images where the shade of each pixel is encoded by an 8-bit integer. 8-bit integer encoding allows 256 possible shades of grey. The program changes the greyscale values into ASCII characters. **Figure 2** shows the image created when loading the `greyscale.txt` data file.

**Figure 2**

```

TestImage2
=====
##&#.
&:#+&
####
  
```

The data files `ascii.txt`, `image2.txt` and `image3.txt` available with this **Preliminary Material** also contain parts of images.

## END OF PRELIMINARY MATERIAL

### Copyright information

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