

Revision Sheet 复习练习卷

A-Level Computer Science · Unit 1 Information representation

20 vocabulary items · 45 marks of exam questions (7 questions)

Part 1 · Vocabulary review 词汇复习 (20 items). The terms this unit is examined on most. Mark it yourself from the answer key. 本单元最常考的词汇，请自行对照答案批改。

Section A · Chinese to English 中译英

Write the English word.

1. 数制

[1]
2. 二进制

[1]
3. 十六进制

[1]
4. 二进制十进数

[1]
5. 字符集

[1]
6. 位图

[1]
7. 文件头

[1]
8. 图像分辨率

[1]
9. 屏幕分辨率

[1]
10. 矢量图形

[1]
11. 模拟数据

[1]
12. 数字数据

[1]
13. 采样

[1]
14. 采样率

[1]
15. 采样分辨率

[1]
16. 压缩

[1]
17. 无损

[1]

18.

有损

[1]
19.

采样分辨率

[1]
20.

帧率

[1]

Part 2 · Exam questions 考试题 (45 marks, 7 questions) begins on the next page. They are ordered easy to difficult and none of them has been set before. 第二部分从下页开始，由易到难。

2 (a) (i) Convert the two's complement binary integer into denary.

10010110

Answer [1]

(ii) Convert the unsigned binary integer into hexadecimal.

10010110

Answer [1]

(iii) Convert the unsigned binary integer into Binary Coded Decimal (BCD). Show your working.

10010101

Working

Answer [2]

(b) Perform the following binary addition.

$$\begin{array}{r}
 1\ 0\ 0\ 0\ 1\ 1\ 0\ 0 \\
 +\ 0\ 1\ 0\ 0\ 0\ 1\ 1\ 0 \\
 \hline
 \end{array}$$

[1]

1 Computers store data in binary form.

(a) State the difference between a tebibyte and a terabyte.

.....
..... [1]

(b) Convert the signed denary value –100 into an 8-bit two’s complement binary integer.

Working
.....

Answer [1]

(c) Convert the denary number 251 into hexadecimal. Show your working.

Working
.....
.....
.....

Answer [2]

(d) Add the following unsigned binary integers.

0 1 0 1 0 0 0 0

+ 0 0 1 1 1 1 1 0

[1]

3 (a) State **one** difference between a kibibyte and a megabyte.

.....

..... [1]

(b) (i) Convert the denary value into a 12-bit two’s complement binary integer.

−196

Answer

[1]

(ii) Convert the Binary Coded Decimal (BCD) into denary.

100001100101

Answer

[1]

(iii) Convert the unsigned binary integer into denary.

000111010110

Answer

[1]

(c) Identify **one** practical application of BCD **and** justify why BCD is used in this application.

Application

.....

Justification

.....

.....

.....

[2]

6 A computer uses the ASCII character set.

(a) State the number of characters that can be represented by the ASCII character set and the extended ASCII character set.

ASCII

Extended ASCII

[2]

(b) Explain how a word such as ‘HOUSE’ is represented by the ASCII character set.

.....
.....
.....
..... [2]

(c) Unicode is a different character set.

The Unicode value for the character ‘1’ is denary value 49.

(i) Write the hexadecimal value for the Unicode character ‘1’.

..... [1]

(ii) Write the denary value for the Unicode character ‘5’.

..... [1]

1 A digital audio message needs to be recorded.

(a) Tick (✓) **one** box in each row to identify the effect of each action on the accuracy of the recording.

Action	Accuracy increases	Accuracy decreases	Accuracy does not change
Change the sampling rate from 40 kHz to 60 kHz.			
Change the duration of the recording from 20 minutes to 40 minutes.			
Change the sampling resolution from 24 bits to 16 bits.			

[2]

(b) The audio message is recorded with a sampling rate of 50 kHz and a sampling resolution of 16 bits.

The recording is 20 minutes in length.

Calculate the file size of the recording.

Give your answer in megabytes **and** show your working.

Working

.....

.....

.....

Answer megabytes

[2]

(c) A computer uses a buffer when playing the audio message.

Explain the purpose of a buffer in a computer system using **one other** example.

.....

.....

.....

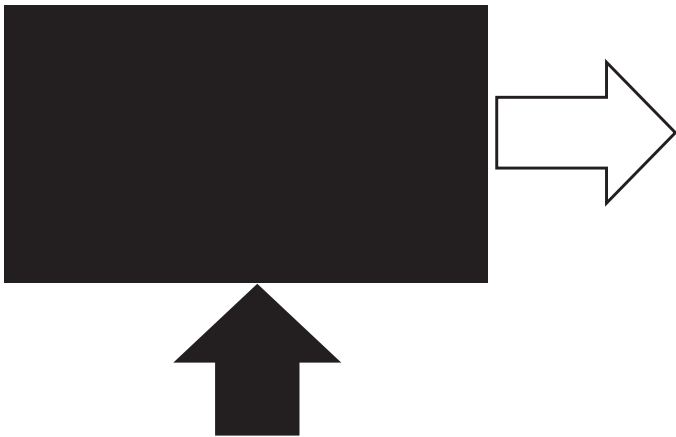
.....

.....

.....

[3]

8 The following bitmap image has a resolution of 4096 × 4096 pixels and a colour depth of 24 bits per pixel.



The image is displayed on a monitor that has a screen resolution of 1920 × 1080 pixels.

(a) Tick (✓) **one** box in each row to identify the effect of each action on the image file size.

Action	Increases the file size	Decreases the file size	No change to the file size
Change the colour depth of the image file to 16 bits per pixel.			
Change the screen resolution to 1366 × 768 pixels.			
Change the colour of the rectangle from black to red.			

[2]

(b) State **two** benefits of creating a vector graphic instead of a bitmap image.

- 1
-
- 2
-

[2]

(c) A second bitmap image is stored using a colour depth of 8 bits per pixel.

The file is compressed using run-length encoding (RLE).

(i) The table shows the compressed and uncompressed values for parts of the image file.

Each colour of the pixel in the image is represented by a hexadecimal value.

Complete the table. The first row has been completed for you.

Uncompressed image	RLE compressed image
EA F1 F1 F2 F2 F2 EA	1EA 2F1 3F2 1EA
	2AB 2FF 11D 167
32 32 80 81 81	

[2]

(ii) RLE is an example of lossless compression.

Explain why lossless compression is more appropriate than lossy compression for a text file.

[2]

7 Bobby is recording a sound file for his school project.

(a) He repeats the recording of the sound several times, with a different sample rate each time.

(i) Describe the reasons why the sound is closer to the original when a higher sample rate is used.

[2]

(ii) Describe the reasons why the sound file size increases when a higher sample rate is used.

[2]

(b) Bobby wants to email the sound file to his school email address. He compresses the file before sending the email.

(i) Explain the reasons why Bobby compresses the sound file.

[2]

(ii) Bobby uses lossless compression.

Describe how lossless compression can compress the sound file.

[2]