|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  | | --- | --- | | **Computer Science (9-1)**  Data Rep Set 3 Paul Burgess |  | | Please note that you may see slight differences between this paper and the original.  Candidates answer on the Question paper.  **OCR supplied materials:** Additional resources may be supplied with this paper.  **Other materials required:** •   Pencil •   Ruler (cm/mm) | **Duration:** Not set | |  | | |  |

## INSTRUCTIONS TO CANDIDATES

•   Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.  
•   Use black ink. HB pencil may be used for graphs and diagrams only.  
•   Answer **all** the questions, unless your teacher tells you otherwise.  
•   Read each question carefully. Make sure you know what you have to do before starting your answer.  
•   Where space is provided below the question, please write your answer there.  
•   You may use additional paper, or a specific Answer sheet if one is provided, but you must clearly show your candidate number, centre number  
    and question number(s).

## INFORMATION FOR CANDIDATES

•   The quality of written communication is assessed in questions marked with either a pencil or an asterisk. In History and Geography   
    a *Quality of extended response* question is marked with an asterisk, while a pencil is used for questions in which *Spelling, punctuation and  
    grammar and the use of specialist terminology* is assessed.  
•   The number of marks is given in brackets **[ ]** at the end of each question or part question.  
•   The total number of marks for this paper is **25**.  
•   The total number of marks may take into account some 'either/or' question choices.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | |  |  | | --- | --- | |  |  | | **1.** | Kofi uses his computer to record an audio file of himself playing his guitar.  He emails his recording to a record label. He uses lossy compression to produce the music file.  Explain **two** reasons why using lossy compression is beneficial.  1      2       |  | | --- | | **[4]** | | | |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | |  |  | | --- | --- | |  |  | | **2.** | The website of a school allows visitors to download JPG, MP3, MPEG and PDF files.  The video clip is compressed using lossy compression.  Explain why lossy compression is suitable for a video clip, but not suitable for a text document.                  **[3]** | | |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | |  |  | | --- | --- | |  |  | | **3(a).** | Files are often compressed before they are sent over the internet.  State what is meant by compression.    **[1]**  State **one** advantage of compressing files before sending them over the internet.    **[1]** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | |  |  | | --- | --- | |  |  | | **(b).** | Two types of compression are lossy and lossless.  State which type of compression is most appropriate for each of the following and explain why it is appropriate.   1. Downloading the source code of a large program  |  |  | | --- | --- | | Type of compression |  |  |  |  | | --- | --- | | Explanation |  |  3. **[3]** 4. Streaming a large video file  |  |  | | --- | --- | | Type of compression |  |  |  |  | | --- | --- | | Explanation |  |  3. **[3]** | | |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | |  |  | | --- | --- | |  |  | | **4.** | When recording a sound file on a computer, the sound needs to be sampled.   1. Describe how sampling is used when storing sound.         **[2]**   1. Explain the effect of the sampling interval on the size and quality of the sound file recorded.             **[3]** | | |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | |  |  | | --- | --- | |  |  | | **5.** | Alex needs to create an audio recording of himself playing his guitar.   1. Explain how sampling is used to make the recording.             **[3]**   1. State the effects of increasing the sample rate of the recording.         **[2]** | | |

**END OF QUESTION paper**

# Mark scheme

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question** | | | **Answer/Indicative content** | **Marks** | **Guidance** |
| 1 |  |  |  Lossy means the decompressed file is not identical to the original…   …the difference is unlikely to be noticed by humans   Lossy will decrease the file size …   … so it can be sent via e-mail | 2 | 1 mark for each bullet. (1 mark for identification of the effect, one mark for an explanation) |
|  |  |  | **Total** | **4** |  |
| 2 |  |  | * When the file is compressed some detail / data / quality / resolution is lost… * … which is not noticeable in the video file / video still viewable with lower quality * … but would make the text file unreadable / lose meaning or comprehension | 3 | *The first bullet is for the idea that something is lost in the compression process.* *The second bullet is for the idea that the video file is still usable with this loss.* *The third bullet is for the idea that the text file is not usable.* |
|  |  |  | **Total** | **3** |  |
| 3 | a |  | * Reduce the size of the file. | 1 |  |
|  |  |  | * Transmits more quickly / uses less bandwidth | 1 | Accept other valid advantages to do with sending files, NOT storage  **Examiner's Comments** This question was generally answered well by most candidates. |
|  | b | i | * Lossless compression * The code has to be exactly as it was originally written * … or else it will not work. | 3 | Explanation must follow from the type of compression given.  **?Examiner's Comments?**?  Middle ability candidates were largely able to show their understanding of lossless and lossy compression by identifying which was to be used in the scenarios given, and stronger candidates were able to also justify why. It was pleasing to see significantly better performance on this topic than in previous sessions, suggesting that centres have heeded to the advice given in previous reports. |
|  |  | ii | * Lossy compression * Achieves higher compression / smaller file size / faster streaming than lossless * Video can still be viewed at lower quality (from the data compressed). | 3 | **?Examiner's Comments ?**? When candidates were justifying the use of lossy compression for the large video, most stated the fact that the loss of detail was relatively inconsequential but only the most able candidates went on to add that in addition it provides better compression ratios than lossless to give a full justification. |
|  |  |  | **Total** | **8** |  |
| 4 |  | i | * The height / amplitude of the sound wave is measured * … at regular intervals * … and converted to binary. | 2 | Remember to transfer marks between (i) and (ii) if necessary… many candidates may make this point in their answer to part (ii)  **Examiner's Comments**  This question was poorly answered and it was obvious that many of the candidates had not studied this. Most candidates thought sampling was the same as compression, while others used their experience of downloading large media files to describe sampling as a “taster file” to determine whether the rest of the file is of acceptable quality. |
|  |  | ii | * If the interval is smaller / if you sample more often you have more data to store… * … so larger file * but the sound reproduced is closer to the original… * …so better quality. | 3 | Accept the converse ie if you sample less often you have a smaller file etc… as long as the explanation is correct  **Examiner's Comments** Some of those who were on the right track lost marks because their answers lacked precision. The question asked about the effect of the sample interval but some candidates interpreted this as the sample rate. As these are reciprocals of each other, the sample rate obviously gives the wrong answers, unless the candidate specifically stated that this is what they were referring to. Other candidates were even less precise with answers like “it increases the quality” without stating what change in the sampling interval increases the quality. |
|  |  |  | **Total** | **5** |  |
| 5 |  | i | * The amplitude / height of the wave is measured * At set / regular intervals / by reasonable example * And stored as a binary number * The samples form an approximated sound wave | 3 | NOT frequency / pitch  NB For the second bullet, this must relate to set intervals / the same interval. A set number of times per second does not suggest the same intervals.   **Examiner's Comments**  Where candidates knew how sound was stored, they were able to give a clear description, and those better candidates did well with this question. Some candidates did not understand the terminology of sampling, and often guessed at the meaning of the word. |
|  |  | ii | * File size increases * So the sound is truer / better quality / more accurate compared to the original / analogue | 2 | **Examiner's Comments**  Many candidates were able to correctly identify that the file size increased. Fewer candidates could express that the quality was improved because it was closer to the original that was being recorded. |
|  |  |  | **Total** | **5** |  |