C2- S8 SIZING

**Q1**

How **many BITS do need** to display a BLACK/WHITE image of 5 pixels width and 4 pixels heights?

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| --- | --- | --- | --- | --- |
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**Correction:**

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| --- | --- |
| Number of pixels | 5 \* 4 = 20 |
| Pixels encoding | ● Value 0 => white  ● Value 1 => black |
| Number of bit for each pixel | 1 |
| Total image size | 20 \* 1 = 20 bits |

**Q2**

Now we want to manage more than BLACK and WHITE: level of grays

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|  |  |
| --- | --- |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |

How **many BITS do we need** to display a LEVEL OF GRAY image of 5 pixels width and 4 pixels heights?

**Correction:**

|  |  |
| --- | --- |
| Number of pixels | 5 \* 4 = 20 |
| Pixels encoding | 8 values to represent the levels of grey (see table) |
| Number of bit for each pixel | 3 *(because 2^3 = 8 values)* |
| Total image size | 20 \* 3 = 60 bits |

**Q3**

We want to send a message

The message is always 4 characters, and each character can be either

- A lower case letters (a, b, c…)

- An upper case letters (A, B, C…)

- A number (1, 2, 3…)

What will be the size (in bits) of your message?

**Correction:**

|  |  |
| --- | --- |
| Number of characters | 4 |
| Characters encoding | We have 62 values  - 26 values for lower cases  - 26 values for upper cases  - 10 values for numbers |
| Number of bit for each pixel | 6 *(because 2^6 = 64 values)* |
| Total image size | 6 \* 4 = 24 bits |