**Sample:** Math - Coding and Encoding Schemes

# Art Work

**Part 1:**
You will deliver:
∗ A piece of artwork that includes a secret message of your choosing. The message must contain at least two words.
∗ Your encoding scheme.
∗ If you worked in pairs, a statement of who did what.
You should deliver your artwork and coding scheme on a single A4 page.
You may be as creative as you like with cell colours and shading. You may send any message you like. You may use any encoding scheme you like. You will be marked on creati vity in both coding scheme and artwork appeal.
**Part 2:**
You have realised that you can produce more effective coded messages if you apply a different number system. This would enable you to produce a more convincing piece of art, with more than two message colours. It would also enable you to encode more than one character per line.
You will deliver:
∗ A piece of artwork that includes a secret message
∗ Your encoding scheme
∗ If you worked in pairs, a statement of who did what.

My coding scheme

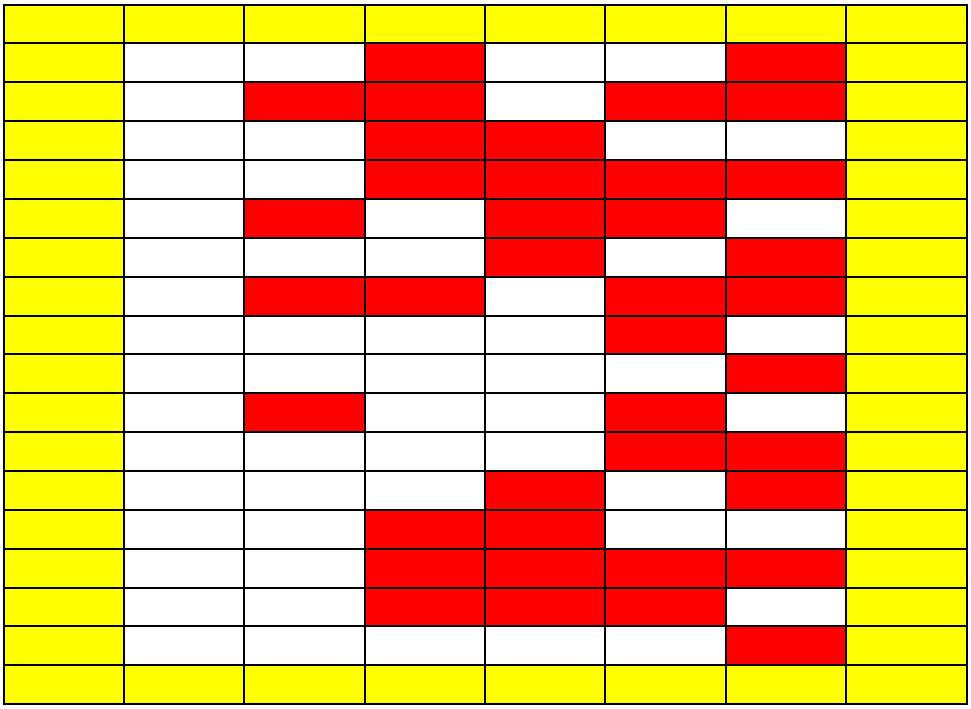
| Symbol | Code | Binary |
|---|---|---|
| A | 1 | 000001 |
| B | 2 | 000010 |
| C | 3 | 000011 |
| D | 4 | 000100 |
| E | 5 | 000101 |
| F | 6 | 000110 |
| G | 7 | 000111 |
| H | 8 | 001000 |
| I | 9 | 001001 |
| J | 10 | 001010 |
| K | 11 | 001011 |
| L | 12 | 001100 |
| M | 13 | 001101 |
| N | 14 | 001110 |
| O | 15 | 001111 |
| P | 16 | 010000 |
| Q | 17 | 010001 |
| R | 18 | 010010 |
| S | 19 | 010011 |
| T | 20 | 010100 |
| U | 21 | 010101 |
| V | 22 | 010110 |
| W | 23 | 010111 |
| X | 24 | 011000 |
| Y | 25 | 011001 |
| Z | 26 | 011010 |
| SP | 27 | 011011 |

| Secret Message | Code | Binary |
|---|---|---|
| I | 9 | 001001 |
| SP | 27 | 011011 |
| L | 12 | 001100 |
| O | 15 | 001111 |
| V | 22 | 010110 |
| E | 5 | 000101 |
| SP | 27 | 011011 |
| B | 2 | 000010 |
| A | 1 | 000001 |
| R | 18 | 010010 |
| C | 3 | 000011 |
| E | 5 | 000101 |
| L | 12 | 001100 |
| O | 15 | 001111 |
| N | 14 | 001110 |
| A | 1 | 000001 |

My encoding scheme

| Binary | Binary to decimal | Summa=decimal Code | Symbol |
|---|---|---|---|
| 001001 | $0\cdot2^5+0\cdot2^4+1\cdot2^3+0\cdot2^2+0\cdot2^1+1\cdot2^0$ | 9 | I |
| 011011 | $0\cdot2^5+1\cdot2^4+1\cdot2^3+0\cdot2^2+1\cdot2^1+1\cdot2^0$ | 27 | SP |
| 001100 | $0\cdot2^5+0\cdot2^4+1\cdot2^3+1\cdot2^2+0\cdot2^1+0\cdot2^0$ | 12 | L |
| 001111 | $0\cdot2^5+0\cdot2^4+1\cdot2^3+1\cdot2^2+1\cdot2^1+1\cdot2^0$ | 15 | O |
| 010110 | $0\cdot2^5+1\cdot2^4+0\cdot2^3+1\cdot2^2+1\cdot2^1+0\cdot2^0$ | 22 | V |
| 000101 | $0\cdot2^5+0\cdot2^4+0\cdot2^3+1\cdot2^2+0\cdot2^1+1\cdot2^0$ | 5 | E |
| 011011 | $0\cdot2^5+1\cdot2^4+1\cdot2^3+0\cdot2^2+1\cdot2^1+1\cdot2^0$ | 27 | SP |
| 000010 | $0\cdot2^5+0\cdot2^4+0\cdot2^3+0\cdot2^2+1\cdot2^1+0\cdot2^0$ | 2 | B |
| 000001 | $0\cdot2^5+0\cdot2^4+0\cdot2^3+0\cdot2^2+0\cdot2^1+1\cdot2^0$ | 1 | A |
| 010010 | $0\cdot2^5+1\cdot2^4+0\cdot2^3+0\cdot2^2+1\cdot2^1+0\cdot2^0$ | 18 | R |
| 000011 | $0\cdot2^5+0\cdot2^4+0\cdot2^3+0\cdot2^2+1\cdot2^1+1\cdot2^0$ | 3 | C |
| 000101 | $0\cdot2^5+0\cdot2^4+0\cdot2^3+1\cdot2^2+0\cdot2^1+1\cdot2^0$ | 5 | E |
| 001100 | $0\cdot2^5+0\cdot2^4+1\cdot2^3+1\cdot2^2+0\cdot2^1+0\cdot2^0$ | 12 | L |
| 001111 | $0\cdot2^5+0\cdot2^4+1\cdot2^3+1\cdot2^2+1\cdot2^1+1\cdot2^0$ | 15 | O |
| 001110 | $0\cdot2^5+0\cdot2^4+1\cdot2^3+1\cdot2^2+1\cdot2^1+0\cdot2^0$ | 14 | N |
| 000001 | $0\cdot2^5+0\cdot2^4+0\cdot2^3+0\cdot2^2+0\cdot2^1+1\cdot2^0$ | 1 | A |

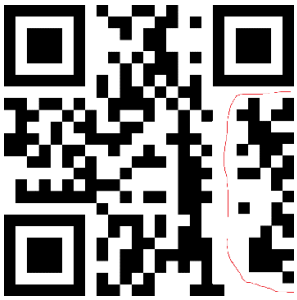
# Art Work 1.1



Red Color -1 White Color – 0

My encoding scheme - example


Art Work1.2 (QR-secret message is in the lower right corner)



The secret message is here

My encoding scheme -example

0 0 1 0 0 1

About QR-code

http://en.wikipedia.org/wiki/QR_code

**Part 2:**
You have realised that you can produce more effective coded messages if you apply a different number system. This would enable you to produce a more convincing piece of art, with more than two message colours. It would also enable you to encode more than one character per line.
You will deliver:
* A piece of artwork that includes a secret message
* Your encoding scheme
* If you worked in pairs, a statement of who did what.

My coding scheme

| Symbol | Decimal Code | Hexadecimal | Union Hexadecimal Color Code |
|---|---|---|---|
| A | 1 | 1 | 1 |
| B | 2 | 2 | 2 |
| C | 3 | 3 | 3 |
| D | 4 | 4 | 4 |
| E | 5 | 5 | 5 |
| F | 6 | 6 | 6 |
| G | 7 | 7 | 7 |
| H | 8 | 8 | 8 |
| I | 9 | 9 | 9 |
| J | 10 | A | |
| K | 11 | B | |
| L | 12 | C | |
| M | 13 | D | |
| N | 14 | E | |
| O | 15 | F | |
| P | 16 | 10 | 10 |
| Q | 17 | 11 | 11 |
| R | 18 | 12 | 12 |
| S | 19 | 13 | 13 |
| T | 20 | 14 | 14 |
| U | 21 | 15 | 15 |
| V | 22 | 16 | 16 |
| W | 23 | 17 | 17 |
| X | 24 | 18 | 18 |
| Y | 25 | 19 | 19 |
| Z | 26 | 1A | 1 |
| SP | 27 | 1B | 1 |

I replaced the letters to the colors of the spectrum so as not to give the key to hexadecimal.

## Coding Message

| Secret Message | Decimal Code | Hexadecimal | Union Hexadecimal Color Code |
|---|---|---|---|
| I | 9 | 9 | 9 |
| SP | 27 | 1B | 1 |
| L | 12 | C | |
| O | 15 | F | |
| V | 22 | 16 | 16 |
| E | 5 | 5 | 5 |
| SP | 27 | 1B | 1 |
| B | 2 | 2 | 2 |
| A | 1 | 1 | 1 |
| R | 18 | 12 | 12 |
| C | 3 | 3 | 3 |
| E | 5 | 5 | 5 |
| L | 12 | C | |
| O | 15 | F | |
| N | 14 | E | |
| A | 1 | 1 | 1 |

| | |
|---|---|
| Start Message | |
| Finish Message | |

If the letter and the number are used at the same time - I replace the letter to the color and write the number on the top. My recipient knows that the coded message in the column is between the two black squares.

The code that I need to hide

| |
|---|
| |
| 9 |
| 1 |
| |
| |
| 16 |
| 5 |
| 1 |
| 2 |
| 1 |
| 12 |
| 3 |
| 5 |
| |
| |
| |
| 1 |
| |

So I decided to hide it in a picture **Art Sudoku**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | 4 | | |
| | | 3 | | | | | 9 | | | | | | | 7 | | |
| | | | | | | | 1 | | | | | | | 12 | | |
| 6 | | 7 | | | | | | | | | | | | 3 | | |
| | | | 2 | | | | | | | | | | | 8 | | |
| 3 | 7 | 5 | 13 | 12 | 4 | 10 | 16 | 1 | 5 | 7 | 2 | 5 | 7 | 7 | 4 | 2 |
| | | 3 | | | | | 5 | | | | | | | 9 | | |
| | 3 | | | | | | 1 | | | | 1 | | | 10 | | |
| | 4 | 5 | | | | | 2 | | | | | | | 12 | 8 | |
| | | 4 | | | | | 1 | | | | | | | 5 | | |
| | | | | | | | 12 | | | | | | | 4 | | |
| | | | | | | | 3 | | | | | | | 8 | | |
| | | | 8 | | | | 5 | | | | | | | | | |
| 8 | 12 | 3 | 5 | 3 | 4 | 14 | | 2 | 5 | 9 | 16 | 22 | 3 | 6 | 4 | 7 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| 1 | 4 | 13 | 11 | 1 | 3 | 4 | 1 | 5 | 6 | 6 | 16 | 15 | 3 | 1 | 9 | 8 |
| | | | | | | | | | | | | | | | | |

**http://en.wikipedia.org/wiki/Sudoku**

Decoding scheme

1. I find two black squares in the column
2. Copy code
3. Decode Union Hexadecimal Color Code
4. Decode Hexadecimal to Decimal Code
5. Decode Decimal Code
6. Vu a la.

| | Start | Hexadecimal | Decimal Code | Secret Message |
|---|---|---|---|---|
| 9 | | 9 | 9 | I |
| 1 | | 1B | 27 | SP |
| | | C | 12 | L |
| | | F | 15 | O |
| 16 | | 16 | 22 | V |
| 5 | | 5 | 5 | E |
| 1 | | 1B | 27 | SP |
| 2 | | 2 | 2 | B |
| 1 | | 1 | 1 | A |
| 12 | | 12 | 18 | R |
| 3 | | 3 | 3 | C |
| 5 | | 5 | 5 | E |
| | | C | 12 | L |
| | | F | 15 | O |
| | | E | 14 | N |
| 1 | | 1 | 1 | A |
| | End | | | |