# Worksheet 1 Number systems

# Task 1: Identifying numbers

Categorise the following numbers. Note that some numbers can be categorised in more than one way.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Number | Natural | Integer | Rational | Irrational | Real | Ordinal |
| 5 | ✓ | ✓ | ✓ |  | ✓ |  |
| -6 |  |  |  |  |  |  |
| 2.$\dot{6}$ |  |  |  |  |  |  |
| $$√2$$ |  |  |  |  |  |  |
| -9.25 |  |  |  |  |  |  |
| 22/7 |  |  |  |  |  |  |
| 123 |  |  |  |  |  |  |
| 10th |  |  |  |  |  |  |
| e |  |  |  |  |  |  |
| 12/8 |  |  |  |  |  |  |
| $$π$$ |  |  |  |  |  |  |
| 0 |  |  |  |  |  |  |
| 3rd |  |  |  |  |  |  |
| $$\infty $$ |  |  |  |  |  |  |
| 2/3 |  |  |  |  |  |  |

# Task 2: Converting binary and decimal values

# A currency icon not represented by keys on the regular QWERTY keyboard can be displayed on a computer monitor using an 8x8 grid. Working right to left, columns in the grid are given binary place values of 1, 2, 4, 8, 16, 32, 64 and 128.

# The values from each row are stored in a table, using the place values to calculate the total. Row one in the figure below gives the value of 32.

1. Complete the values for rows 2-8 to store the ₺ character for Turkish Lira**.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **128** | **64** | **32** | **16** | **8** | **4** | **2** | **1** |  | **Row** | **Value** |
|  |  |  |  |  |  |  |  |  | **1** | **32** |
|  |  |  |  |  |  |  |  |  | **2** |  |
|  |  |  |  |  |  |  |  |  | **3** |  |
|  |  |  |  |  |  |  |  |  | **4** |  |
|  |  |  |  |  |  |  |  |  | **5** |  |
|  |  |  |  |  |  |  |  |  | **6** |  |
|  |  |  |  |  |  |  |  |  | **7** |  |
|  |  |  |  |  |  |  |  |  | **8** |  |

1. Draw the Euro character € formed from the data values in the table below:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **128** | **64** | **32** | **16** | **8** | **4** | **2** | **1** |  | **Row** | **Value** |
|  |  |  |  |  |  |  |  |  | **1** | 28 |
|  |  |  |  |  |  |  |  |  | **2** | 50 |
|  |  |  |  |  |  |  |  |  | **3** | 248 |
|  |  |  |  |  |  |  |  |  | **4** | 96 |
|  |  |  |  |  |  |  |  |  | **5** | 252 |
|  |  |  |  |  |  |  |  |  | **6** | 32 |
|  |  |  |  |  |  |  |  |  | **7** | 51 |
|  |  |  |  |  |  |  |  |  | **8** | 30 |

# Task 3: Converting hexadecimal values

1. The following colour code **#2A17A5** is represented in hexadecimal. Convert the Red, Green and Blue components into their decimal equivalents.

|  |  |  |
| --- | --- | --- |
| **Red: 2A** | **Green: 17** | **Blue: A5** |

1. Red:
2. Green:
3. Blue:
4. Convert the following three decimal RGB colour values into their full hexadecimal equivalent in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
|  | a) Red 5810 | b) Green 12610 | c) Blue 20210 |
| **#** |  |  |  |

1. Convert the following binary ASCII values for the word ‘**Jam**’ into their hexadecimal equivalents:

|  |  |  |  |
| --- | --- | --- | --- |
|  | a) **J** | b) **a** | c) **m** |
| Binary values: | 01001010 | 01100001 | 01101101 |
| Hexadecimal values: |  |  |  |

1. Convert the following three hexadecimal values into 8-bit binary equivalents:
2. 1616
3. D716
4. FF16