NOTE: Use of internet is not permitted, apart from uploading submission, calculators are permitted and your answers must include worked solutions. If you require extra sheet(s) please write your name and student number at the top of each additional sheet.

**Part A**

**Objective**

Convert decimal numbers to binary showing in detail the conversion process

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| 1. Convert the number of days in a year **36510** to **Base2** |
| **36510** to **Base2**    2**^ Value Count RT REM Binary**  2**^8 256 1 256 109 100000000**  2**^7 128 0 256 109 100000000**  2**^6 64 1 320 45 101000000**  2**^5 32 1 352 13 101100000**  2**^4 16 0 352 13 101100000**  2**^3 8 1 360 5 101101000**  2**^2 4 1 364 1 101101100**  2**^1 2 0 364 1 101101100**  2**^0 1 1 365 0 101101101**  **36510** to **Base 2 is 101101101** |
| 1. Convert the number of available seats in the new Páirc Uí Chaoimh **45,00110** to **Base2** |
| **45,00110** to **Base2**  2**^ Value Count RT REM Binary**  2**^15 32,768 1 32,768 12,233 1000000000000000**  2**^14 16,384 0 32,768 12,233 1000000000000000**  2**^13 8,192 1 40,960 4,041 1010000000000000**  2**^12 4,096 0 40,960 4,041 1010000000000000**  2**^11 2,048 1 43,008 1,993 1010100000000000**  2**^10 1,024 1 44,032 969 1010110000000000**  2**^9 512 1 44,544 457 1010111000000000**  2**^8 256 1 44,800 201 1010111100000000**  2**^7 128 1 44,928 73 1010111110000000**  2**^6 64 1 44,992 9 1010111111000000**  2**^5 32 0 44,992 9 1010111111000000**  2**^4 16 0 44,992 9 1010111111000000**  2**^3 8 1 45,000 1 1010111111001000**  2**^2 4 0 45,000 1 1010111111001000**  2**^1 2 0 45,000 1 1010111111001000**  2**^0 1 1 45,001 0 1010111111001001**  **45,00110** to **Base 2 is 1010111111001001** |
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**Part B**

**Objective**

Convert numbers base2 to Base10 showing in detail the conversion process

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| 1. Convert the number **10110010011101012** to **Base10** |
| **10110010011101012** to **Base10**  2**^14** 2**^12** 2**^10** 2**^8** 2**^6** 2**^4** 2**^2** 2**^0**  **1 0 1 1 0 0 1 0 0 1 1 1 0 1 0 12**  2**^15** 2**^13**  2**^11** 2**^9**  2**^7**  2**^5**  2**^3** 2**^1**  | | | | | | | | | | | | | | | |  | 16384 | 4096 | 1024 | 256 | 64 | 16 | 4 | 1 | 32768 8192 2048 512 128 32 8 2  (32768\*1)+(16384\*0)+(8192\*1)+(4096\*1)+(2048\*0)+(1024\*0)+(512\*1)+(256\*0)+(128\*0)+(64\*1)+(32\*1)+(16\*1)+(8\*0)+(4\*1)+(2\*0)+(1\*1)  32768+0+8192+4096+0+0+512+0+0+64+32+16+0+4+0+1 = 45685 |
| 1. Convert the number **101110.10011110112** to **Base10** |
| **101110.10011110112** to **Base10**  2**^14** 2**^12** 2**^10** 2**^8** 2**^6** 2**^4** 2**^2** 2**^0**  **1 0 1 1 1 0 .1 0 0 1 1 1 1 0 1 12** 2**^15** 2**^13**  2**^11** 2**^9**  2**^7**  2**^5**  2**^3** 2**^1**  | | | | | | | | | | | | | | | |  | 16384 | 4096 | 1024 | 256 | 64 | 16 | 4 | 1 | 32768 8192 2048 512 128 32 8 2  (32768\*1)+(16384\*0)+(8192\*1)+(4096\*1)+(2048\*1)+(1024\*0)+(512\*1)+(256\*0)+(128\*0)+(64\*1)+(32\*1)+(16\*1)+(8\*1)+(4\*0)+(2\*1)+(1\*1)  32768+8192+4096+2048+512+64+32+16+8+2+1=47.739 |

**Part C**

**Objective**

Add numbers base2 to base2 showing in detail the addition process

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| 1. What is the **Base2** value of addition of **1001 01112**+ **0101 11112** |
| **1001 01112**+  **0101 11112**  1111 0110**2** |
| 1. What is the **Base2** value of addition of **1001.01012**+ **010.1 11012** |
| **1001.01012**+  **010.1 11012**  1111. 0010**2** |
|  |

Hand up this practical report at the end of session and ensure it has been checked

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| --- | --- | --- | --- |
| **Student Name** | **Marcel Zama** | **Student Number** | **C00260146** |
| **Date** | **03/11/2021** | **Checked** |  |
| **Group** | **A / B** |  |  |