**Introduction to Computer Systems and Platform Technologies**

Study Period 3, 2021 – CPT160

Assessment 1

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| **Student Number:** | S3875753 |

# Task 1 – Number Systems

Student Number: s3875753  
X = 5753

1. Convert X from decimal to binary

|  |  |  |  |
| --- | --- | --- | --- |
| Devision by 2 | Quotient | Remainder | Bit# |
| 5753/2 | 2876 | 1 | 0 |
| 2876/2 | 1438 | 0 | 1 |
| 1438/2 | 719 | 0 | 2 |
| 719/2 | 359 | 1 | 3 |
| 359/2 | 179 | 1 | 4 |
| 179/2 | 89 | 1 | 5 |
| 89/2 | 44 | 1 | 6 |
| 44/2 | 22 | 0 | 7 |
| 22/2 | 11 | 0 | 8 |
| 11/2 | 5 | 1 | 9 |
| 5/2 | 2 | 1 | 10 |
| 2/2 | 1 | 0 | 11 |
| 1/2 | 0 | 1 | 12 |

X = 0001 0110 0111 1001

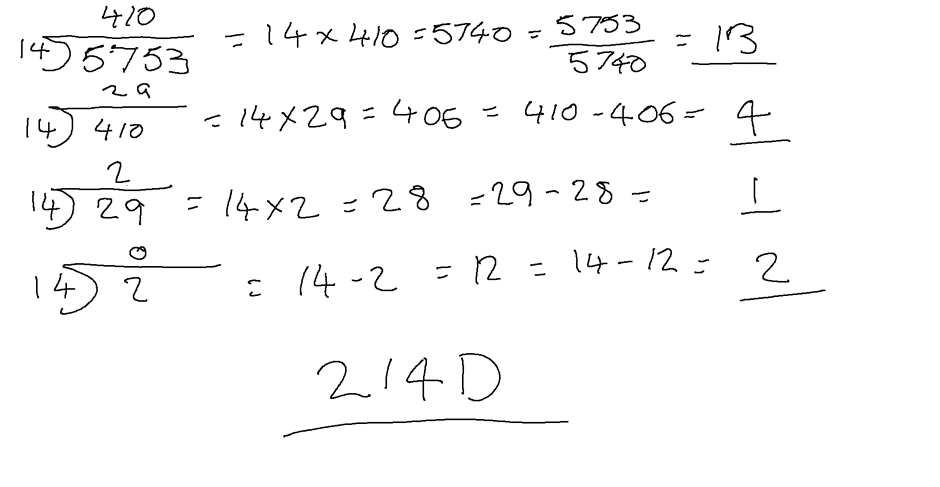
1. Convert the binary string obtained from your answer to (a) into an octal and hexadecimal
   1. Octal Conversion

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| |  |  | | --- | --- | | **Octal Digit Value** | **Binary Equivalent** | | 0 | 000 | | 1 | 001 | | 2 | 010 | | 3 | 011 | | 4 | 100 | | 5 | 101 | | 6 | 110 | | 7 | 111 | | |  |  |  |  |  | | --- | --- | --- | --- | --- | | 001 | 011 | 001 | 111 | 001 | | 1 | 3 | 1 | 7 | 1 |   Octal = 13171 |

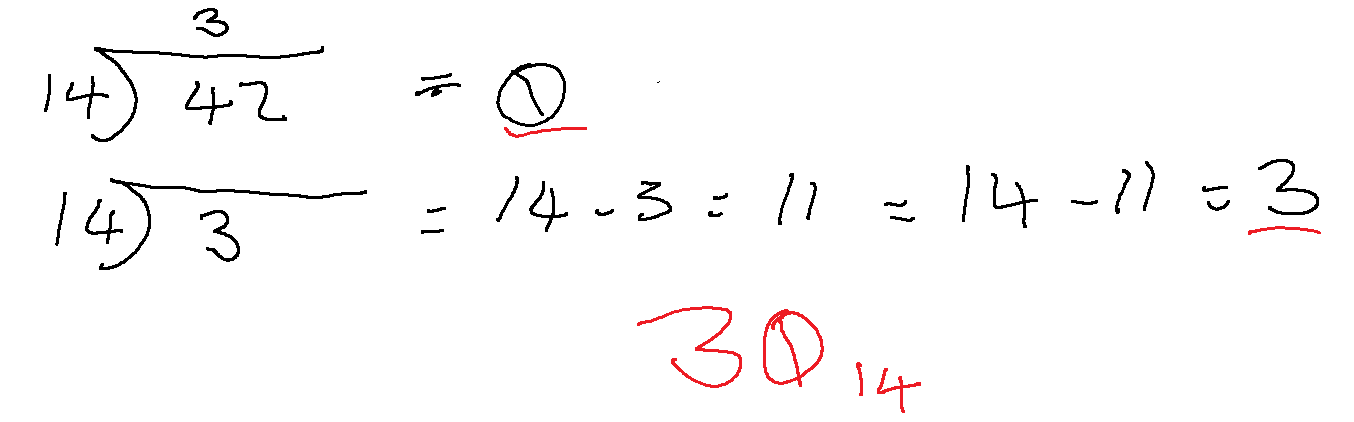
* 1. Hexadecimal Conversion

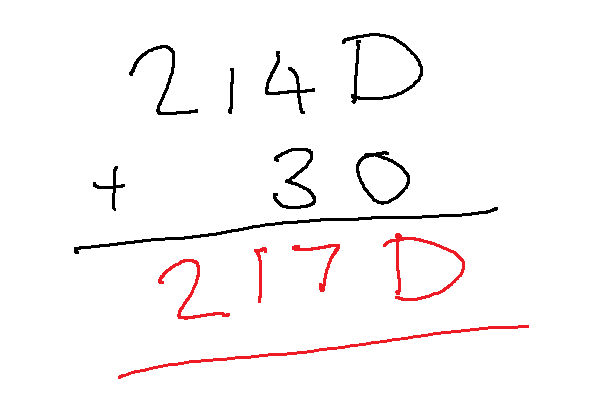
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | **Hex Value** | **Binary Equivalent** | | 0 | 0000 | | 1 | 0001 | | 2 | 0010 | | 3 | 0011 | | 4 | 0100 | | 5 | 0101 | | 6 | 0110 | | 7 | 0111 | | 8 | 1000 | | 9 | 1001 | | A | 1010 | | B | 1011 | | C | 1100 | | D | 1101 | | |  |  |  |  | | --- | --- | --- | --- | | 0001 | 0110 | 0111 | 1001 | | 1 | 6 | 7 | 9 |   Hexadecimal = 13171 |

1. Convert X from decimal to base 14, Where A, B,C and D correspond to 10, 11, 12 and 13 respectively.

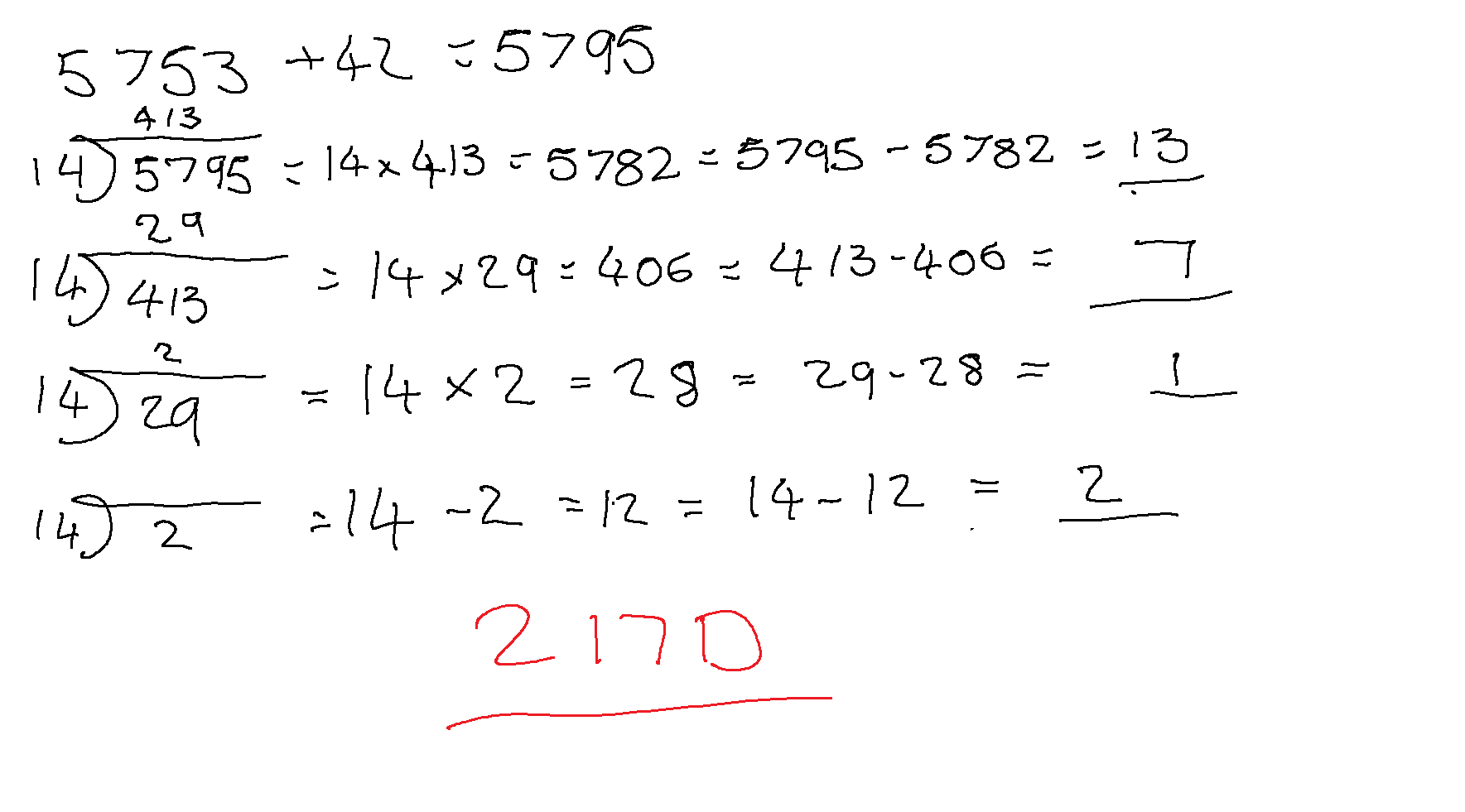


1. Now add (42 in decimal) to X and calculate the sum in base 14. Consider the following two calculations:
2. Conversion (base 14 to decimal) before addition (in base 14): convert in to base 14, then add the two base 14 numbers.





1. Addition (in decimal) before conversion (decimal to base 14): add to X in decimal, then convert the decimal sum into base 14.



1. Which calculation is simpler? Please explain you answer. How many digits are different from your answer to (c)?
2. Consider a base 26 number system wherein the letters of the alphabet are the digits.

*That is, A=0, B=1, C=2, ….Z=25 in base 10.*

Use the first three letters of your given name as a number in the base 26 system, and the first three letters of your surname as another number in the base 26 system.

Add these numbers together to obtain the sum in base 26.

# Task 2 – Binary Addition and Subtraction

# Task 3 – Bitwise Operations

# Task 4 – Logic Circuits and Truth Tables

# Task 5 – Pipelining

# Task 6 – CPU Architecture

# Task 7 – Memory

# Task 8 – Hamming & SECDED Code

# Advanced Questions