Date :.....

MON TUE WED THU FRI SAT SUN

Assignment 1

Create a base 14 numbering system.

→ Define a base 14 numbering system.
→ List down two digit numbers
→ Demo: Single digit addition and subtraction
→ Demo: Double digit addition and subtraction
→ Demo: Write table BXB
→ Demo: Multiplication for single digit
→ Demo: Multiplication for double digit
→ Translate: Base 10 to Base 14 and vice versa

Base 14 numbering system

Digits

0, 1, 2, 3, 4, 5, 6, 7, 8, 9,
A, B, C, D

Two digit numbers

00 01 02 03 04 05 06 07 08 09
0A 0B 0C 0D

10 11 12 13 14 15 16 17 18 19
1A 1B 1C 1D

Date :.....

MON TUE WED THU FRI SAT SUN

20 21 22 23 24 25 26 27 28 29
2A 2B 2C 2D

30 31 32 33 34 35 36 37 38 39
3A 3B 3C 3D

40 41 42 43 44 45 46 47 48 49
4A 4B 4C 4D

50 51 52 53 54 55 56 57 58 59
5A 5B 5C 5D

60 61 62 63 64 65 66 67 68 69
6A 6B 6C 6D

70 71 72 73 74 75 76 77 78 79
7A 7B 7C 7D

80 81 82 83 84 85 86 87 88 89
8A 8B 8C 8D

90 91 92 93 94 95 96 97 98 99
9A 9B 9C 9D

A0 A1 A2 A3 A4 A5 A6 A7 A8 A9
AA AB AC AD

Date :.....

MON TUE WED THU FRI SAT SUN

B0 B1 B2 B3 B4 B5 B6 B7 B8 B9
BA BB BC BD

C0 C1 C2 C3 C4 C5 C6 C7 C8 C9
CA CB CC CD

D0 D1 D2 D3 D4 D5 D6 D7 D8 D9
DA DB DC DD

Single digit addition

A + 3 = D

5 + 7 = C

9 + 9 = 14

Base 10 = 9+9 = 18

In Base 14

14 | 18 4

14 | 1 1 ↑ = 14

0

Single digit subtraction

A - 3 = 7

D - A = 3

9 - 4 = 5

Date :.....

MON TUE WED THU FRI SAT SUN

Double digit addition

1A + 2B :—

$$\begin{array}{r} 1\ A \\ +\ 2\ B \\ \hline 3\ D \end{array}$$

1A + 2B = 3D

Double digit Subtraction

2B - 1A :—

$$\begin{array}{r} 2\ B \\ -\ 1\ A \\ \hline 1\ 1 \end{array}$$

2B - 1A = 11

Multiplication table

→

Date :.....

MON TUE WED THU FRI SAT SUN

1 x 1 = 1	2 x 1 = 2	3 x 1 = 3
1 x 2 = 2	2 x 2 = 4	3 x 2 = 6
1 x 3 = 3	2 x 3 = 6	3 x 3 = 9
1 x 4 = 4	2 x 4 = 8	3 x 4 = C
1 x 5 = 5	2 x 5 = A	3 x 5 = 11
1 x 6 = 6	2 x 6 = C	3 x 6 = 14
1 x 7 = 7	2 x 7 = 10	3 x 7 = 17
1 x 8 = 8	2 x 8 = 12	3 x 8 = 1A
1 x 9 = 9	2 x 9 = 14	3 x 9 = 1D
1 x A = A	2 x A = 16	3 x A = 22
1 x B = B	2 x B = 18	3 x B = 25
1 x C = C	2 x C = 1A	3 x C = 28
1 x D = D	2 x D = 1C	3 x D = 2B

4 x 1 = 4	5 x 1 = 5
4 x 2 = 8	5 x 2 = A
4 x 3 = C	5 x 3 = 11
4 x 4 = 10	5 x 4 = 14
4 x 5 = 14	5 x 5 = 19
4 x 6 = 18	5 x 6 = 1E
4 x 7 = 1C	5 x 7 = 23
4 x 8 = 20	5 x 8 = 28
4 x 9 = 24	5 x 9 = 2D
4 x A = 28	5 x A = 32
4 x B = 2C	5 x B = 37
4 x C = 30	5 x C = 3C
4 x D = 34	5 x D = 41

Date :.....

MON TUE WED THU FRI SAT SUN

6 x 1 = 6
6 x 2 = C
6 x 3 = 14
6 x 4 = 18
6 x 5 = 1E
6 x 6 = 24
6 x 7 = 2A
6 x 8 = 30
6 x 9 = 36
6 x A = 3C
6 x B = 42
6 x C = 48
6 x D = 4E

7 x 1 = 7
7 x 2 = 10
7 x 3 = 17
7 x 4 = 1C
7 x 5 = 23
7 x 6 = 2A
7 x 7 = 31
7 x 8 = 38
7 x 9 = 3F
7 x A = 46
7 x B = 4D
7 x C = 54
7 x D = 5B

8 x 1 = 8
8 x 2 = 12
8 x 3 = 1A
8 x 4 = 20
8 x 5 = 28
8 x 6 = 30
8 x 7 = 38
8 x 8 = 40
8 x 9 = 48
8 x A = 50
8 x B = 58
8 x C = 60
8 x D = 68

9 x 1 = 9
9 x 2 = 14
9 x 3 = 1D
9 x 4 = 24
9 x 5 = 2D
9 x 6 = 36
9 x 7 = 3F
9 x 8 = 48
9 x 9 = 51
9 x A = 5A
9 x B = 63
9 x C = 6C
9 x D = 75

Date :.....

MON TUE WED THU FRI SAT SUN

A x 1 = A
A x 2 = 16
A x 3 = 22
A x 4 = 28
A x 5 = 32
A x 6 = 3C
A x 7 = 3E46
A x 8 = 50
A x 9 = 5A
A x A = 64
A x B = 6E
A x C = 78
A x D = 82

B x 1 = B
B x 2 = 18
B x 3 = 25
B x 4 = 2C
B x 5 = 37
B x 6 = 42
B x 7 = 4D
B x 8 = 58
B x 9 = 63
B x A = 6E
B x B = 79
B x C = 84
B x D = 8F

C x 1 = C
C x 2 = 1A
C x 3 = 28
C x 4 = 30
C x 5 = 3C
C x 6 = 48
C x 7 = 54
C x 8 = 60
C x 9 = 6C
C x A = 78
C x B = 84
C x C = 90
C x D = 9C

D x 1 = D
D x 2 = 1C
D x 3 = 26
D x 4 = 34
D x 5 = 41
D x 6 = 4E
D x 7 = 5B
D x 8 = 68
D x 9 = 75
D x A = 82
D x B = 81E
D x C = 9C
D x D = A9

Date :.....

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Multiplication for single digit

A x 3 = 22

A = 10

3 = 3

10 x 3 = 30

14 | 30 | 2 ↑

14 | 2 | 2

0

= 22

Multiplication for double digit

1A x 2B = 4AC

24

x 39

936

14 | 93C | 12 = C

14 | 66 | 10 = A ↑

14 | 4 | 4

6

Date :.....

MON TUE WED THU FRI SAT SUN

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Base 10 to Base 14

$(200)_{10}$

14 | 200	4	↑
14 | 14	0	|
14 | 1	1	|
0		

$(200)_{10} = (104)_{14}$

Base 14 to Base 10

$(102)_{14}$

$2 \times 14^0 + 0 \times 14^1 + 1 \times 14^2$

$2 + 0 + 196$

$= (198)_{14}$

$(102)_{14} = (198)_{14}$