

PRENSICA, JOSHUA WEEK 13 PART 1

NO.:
DATE:

Premsica, Joshua DSIT-2-3 DISCRETE MATHEMATICS

I

1) $25463 \rightarrow \text{BASE } 2$

$$25463/2 = 12731 \text{ r } 1$$

$$12731/2 = 6365 \text{ r } 1$$

$$6365/2 = 3182 \text{ r } 1$$

$$3182/2 = 1591 \text{ r } 0$$

$$1591/2 = 795 \text{ r } 1$$

$$795/2 = 397 \text{ r } 1$$

$$397/2 = 198 \text{ r } 1$$

$$198/2 = 99 \text{ r } 0$$

$$99/2 = 49 \text{ r } 1$$

$$49/2 = 24 \text{ r } 1$$

$$24/2 = 12 \text{ r } 0$$

$$12/2 = 6 \text{ r } 0$$

$$6/2 = 3 \text{ r } 0$$

$$3/2 = 1 \text{ r } 1$$

$$1/2 = 0 \text{ r } 1$$

$$= 110001101110111$$

$25463 \rightarrow \text{BASE } 8$

$$25463/8 = 3182 \text{ r } 7$$

$$3182/8 = 397 \text{ r } 6$$

$$397/8 = 49 \text{ r } 5$$

$$49/8 = 6 \text{ r } 1$$

$$6/8 = 0 \text{ r } 6$$

$$= 615678$$

$25463 \rightarrow \text{BASE } 5$

$$25463/5 = 5092 \text{ r } 3$$

$$5092/5 = 1018 \text{ r } 2$$

$$1018/5 = 203 \text{ r } 3$$

$$203/5 = 40 \text{ r } 3$$

$$40/5 = 8 \text{ r } 0$$

$$8/5 = 1 \text{ r } 3$$

$$1/5 = 0 \text{ r } 1$$

$$= 13033235$$

$25463 \rightarrow \text{BASE } 16$

$$25463/16 = 1591 \text{ r } 7$$

$$1591/16 = 99 \text{ r } 7$$

$$99/16 = 6 \text{ r } 3$$

$$6/16 = 0 \text{ r } 6$$

$$= 637716$$

$25463 \rightarrow \text{BASE } 20$

$$25463/20 = 1273 \text{ r } 3$$

$$1273/20 = 63 \text{ r } 13$$

$$63/20 = 3 \text{ r } 3$$

$$3/20 = 0 \text{ r } 3$$

$$= 3303$$

NO.:
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2) 31476 \rightarrow BASE 2

$$31476/2 = 15738 \text{ r } 0$$

$$15738/2 = 7869 \text{ r } 0$$

$$7869/2 = 3934 \text{ r } 1$$

$$3934/2 = 1967 \text{ r } 0$$

$$1967/2 = 983 \text{ r } 1$$

$$983/2 = 491 \text{ r } 1$$

$$491/2 = 245 \text{ r } 1$$

$$245/2 = 122 \text{ r } 1$$

$$122/2 = 61 \text{ r } 0$$

$$61/2 = 30 \text{ r } 1$$

$$30/2 = 15 \text{ r } 0$$

$$15/2 = 7 \text{ r } 1$$

$$7/2 = 3 \text{ r } 1$$

$$3/2 = 1 \text{ r } 1$$

$$1/2 = 0 \text{ r } 1$$

$$= \boxed{111101011101002}$$

31476 \rightarrow BASE 8

$$31476/8 = 3934 \text{ r } 4$$

$$3934/8 = 491 \text{ r } 6$$

$$491/8 = 61 \text{ r } 3$$

$$61/8 = 7 \text{ r } 5$$

$$7/8 = 0 \text{ r } 7$$

$$= \boxed{753646}$$

31476 \rightarrow BASE 16

$$31476/16 = 1967 \text{ r } 4$$

$$1967/16 = 122 \text{ r } 15$$

$$122/16 = 7 \text{ r } 10$$

$$7/16 = 0 \text{ r } 7$$

$$= \boxed{7AE4_{16}}$$

31476 \rightarrow BASE 20

$$31476/20 = 1573 \text{ r } 6$$

$$1573/20 = 78 \text{ r } 13$$

$$78/20 = 3 \text{ r } 18$$

$$3/20 = 0 \text{ r } 3$$

$$= \boxed{31D620}$$

31476 \rightarrow BASE 5

$$31476/5 = 6295 \text{ r } 1$$

$$6295/5 = 1259 \text{ r } 0$$

$$1259/5 = 251 \text{ r } 4$$

$$251/5 = 50 \text{ r } 1$$

$$50/5 = 10 \text{ r } 0$$

$$10/5 = 2 \text{ r } 0$$

$$2/5 = 0 \text{ r } 2$$

$$= \boxed{20014015}$$

PRENSICA, JOSHUA WEEK 13 PART 3

NO.:
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3) $46785 \rightarrow \text{BASE } 2$

$$46785/2 = 23392 \text{ r } 1$$

$$23392/2 = 11696 \text{ r } 0$$

$$11696/2 = 5848 \text{ r } 0$$

$$5848/2 = 2924 \text{ r } 0$$

$$2924/2 = 1462 \text{ r } 0$$

$$1462/2 = 731 \text{ r } 0$$

$$731/2 = 365 \text{ r } 1$$

$$365/2 = 182 \text{ r } 1$$

$$182/2 = 91 \text{ r } 0$$

$$91/2 = 45 \text{ r } 1$$

$$45/2 = 22 \text{ r } 1$$

$$22/2 = 11 \text{ r } 0$$

$$11/2 = 5 \text{ r } 1$$

$$5/2 = 2 \text{ r } 1$$

$$2/2 = 1 \text{ r } 0$$

$$1/2 = 0 \text{ r } 1$$

$$= \boxed{1011011011000001_2}$$

$46785 \rightarrow \text{BASE } 8$

$$46785/8 = 5848 \text{ r } 1$$

$$5848/8 = 731 \text{ r } 0$$

$$731/8 = 91 \text{ r } 3$$

$$91/8 = 11 \text{ r } 3$$

$$11/8 = 1 \text{ r } 3$$

$$1/8 = 0 \text{ r } 1$$

$$= \boxed{133301_8}$$

$46785 \rightarrow \text{BASE } 16$

$$46785/16 = 2924 \text{ r } 1$$

$$2924/16 = 182 \text{ r } 12$$

$$182/16 = 11 \text{ r } 6$$

$$11/16 = 0 \text{ r } 11$$

$$= \boxed{B6C1_{16}}$$

$46785 \rightarrow \text{BASE } 5$

$$46785/5 = 9357 \text{ r } 0$$

$$9357/5 = 1871 \text{ r } 2$$

$$1871/5 = 374 \text{ r } 1$$

$$374/5 = 74 \text{ r } 4$$

$$74/5 = 14 \text{ r } 4$$

$$14/5 = 2 \text{ r } 4$$

$$2/5 = 0 \text{ r } 2$$

$$= \boxed{2444120_5}$$

$46785 \rightarrow \text{BASE } 20$

$$46785/20 = 2339 \text{ r } 5$$

$$2339/20 = 116 \text{ r } 19$$

$$116/20 = 5 \text{ r } 16$$

$$5/20 = 0 \text{ r } 5$$

$$= \boxed{5GJ5_{20}}$$

PRENSICA, JOSHUA WEEK 13 PART 4

NO.: 12
DATE:

Test II

1. 110111011101₂

Solution

$$\begin{aligned}
 &= (1 \times 2^{12}) + (1 \times 2^{11}) + (0 \times 2^{10}) + (1 \times 2^9) + (1 \times 2^8) + (1 \times 2^7) + (0 \times 2^6) + \\
 &(1 \times 2^5) + (1 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0) \\
 &= 4096 + 2048 + 0 + 512 + 256 + 128 + 0 + 32 + 16 + 8 + 4 + 0 + 1 \\
 &= 7101_{10}
 \end{aligned}$$

2. 1011101101111

$$\begin{aligned}
 &= (1 \times 2^{12}) + (0 \times 2^{11}) + (1 \times 2^{10}) + (1 \times 2^9) + (1 \times 2^8) + (0 \times 2^7) + (1 \times 2^6) + (1 \times 2^5) + \\
 &(0 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (1 \times 2^1) + (1 \times 2^0) \\
 &= 4096 + 0 + 1024 + 512 + 256 + 0 + 64 + 32 + 0 + 8 + 4 + 2 + 1 \\
 &= 5999_{10}
 \end{aligned}$$

3. 11001101101101

$$\begin{aligned}
 &= (1 \times 2^{13}) + (1 \times 2^{12}) + (0 \times 2^{11}) + (0 \times 2^{10}) + (1 \times 2^9) + (1 \times 2^8) + (0 \times 2^7) + (1 \times 2^6) + \\
 &(1 \times 2^5) + (0 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (1 \times 2^1) + (1 \times 2^0) \\
 &= 8192 + 4096 + 0 + 0 + 512 + 256 + 0 + 64 + 32 + 0 + 8 + 4 + 0 + 1 \\
 &= 13165_{10}
 \end{aligned}$$

III.

1. 4563578

$$\begin{aligned}
 &= (4 \times 8^5) + (5 \times 8^4) + (6 \times 8^3) + (3 \times 8^2) + (5 \times 8^1) + (7 \times 8^0) \\
 &= 131072 + 26480 + 3072 + 192 + 40 + 7 \\
 &= 154863_{10}
 \end{aligned}$$

2. 7235458

$$\begin{aligned}
 &= (7 \times 8^5) + (2 \times 8^4) + (3 \times 8^3) + (5 \times 8^2) + (4 \times 8^1) + (5 \times 8^0) \\
 &= 229376 + 8192 + 1536 + 320 \\
 &= 2547428 \\
 &= (2 \times 8^5) + (5 \times 8^4) + (4 \times 8^3) + (7 \times 8^2) + (4 \times 8^1) + (2 \times 8^0) \\
 &= 65536 + 20480 + 2048 + 448 + 32 + 2 \\
 &= 88546_{10}
 \end{aligned}$$

PRENSICA, JOSHUA WEEK 13 PART 5

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TEST IV

1) 58FE16

$$= (5 \times 16^3) + (8 \times 16^2) + (15 \times 16^1) + (14 \times 16^0)$$

$$= 20480 + 2048 + 240 + 14$$

$$= \boxed{22782_{10}}$$

2) CD9816

$$= (12 \times 16^3) + (13 \times 16^2) + (9 \times 16^1) + (8 \times 16^0)$$

$$= 49152 + 3328 + 144 + 8$$

$$= \boxed{52632_{10}}$$

3) 76ACB16

$$= (7 \times 16^4) + (6 \times 16^3) + (10 \times 16^2) + (12 \times 16^1) + (11 \times 16^0)$$

$$= 458752 + 24576 + 2560 + 192 + 11$$

$$= \boxed{480911_{10}}$$

TEST V

1. SHIFT BY 4 TO THE LEFT 1. I AM A GOOD CITIZEN COVID WILL END

2. SHIFT BY 6 TO THE RIGHT 2. LOCKDOWN OR MARTIAL LAW

3. SHIFT BY 9 TO THE LEFT 3. XABI PEAKTUNE

A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25

1) I AM A GOOD CITIZEN COVID WILL END

= E W I W C K K Z Y E P E V A S Y K R E Z C E N H A J Z

2) I AM A GOOD CITIZEN COVID WILL END

= D G S G M V V J I O Z O F K T I U B A J C O R R K T J

3) I AM A GOOD CITIZEN COVID WILL END

= Z R D R X F F U T Z K Z Q V E T E M Z U N K C V E U

2. LOCKDOWN OR MARTIAL LAW

= H K Y G Z K S T K N I W N P E N H A W S

LOCKDOWN OR MARTIAL LAW

= B V I Q I U C T V X G L Z O G R P G C

LOCKDOWN OR MARTIAL LAW

= C F T O Y F N E F I D A K L R C C R N

NO.:
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3) XAGI PER KIMNE

= TWC ELA M6PIJA

YAGI PER KIMNE

= D6MDURWRZ6TK

XAGI PER KIMNE

= DR XZ6V H6KDFU

VII. HASH FUNCTION

	m value	k value
1.	312	9352145
2.	117	2458730
3.	214	148796258
4.	964	254872341

Solutions

$$1. h(9352145) = 9352145 \bmod 312 = 57$$

$$2. h(2458730) = 2458730 \bmod 117 = 92$$

$$3. h(148796258) = 148796258 \bmod 214 = 132$$

$$4. h(254872341) = 254872341 \bmod 964 = 381$$