

AP CSP Python with Robots Binary Numbers Activity Guide		Name:	
Warm Up How many ways can you represent “7”?			
Answers could include: math equations like 1 + 6, words like seven in English and different languages, circles or shapes, fingers on hands, hash marks, Roman numerals, etc.			
Activity #1 Watch the video: Secret Coders video			
Activity #2A Get the Activity 2 Form and pennies. Use them to convert a number to binary.		Activity #2B Get the Activity 2 Form and pennies. Use them to convert binary to a decimal number.	
Decimal Number	Binary	Binary	Decimal Number
1	0001	0010	2
4	0100	0110	6
8	1000	1001	9
13	1101	1110	14
Activity #3 Get a flippy-do. Use it to convert a binary to decimal, and a decimal to binary.			
Binary	Decimal	Decimal	Binary
0000 1010	10	5	0000 0101
0001 1100	28	12	0000 1100
0010 0000	32	30	0001 1110
1010 0001	161	100	0110 0100
0011 0110	54	153	1001 1001
Activity #4 Use your CodeBot and a program to check your answers from Activity #3.			
Decimal Number	My answer from Activity 4	CodeBot answer	
5	0000 0101	Should be the same	
12	0000 1100		
30	0001 1110		
100	0110 0100		
153	1001 1001		
Wrap Up: Match the code. Which lines of code will light up the same user LEDs?			

Instructions: Match the code. Which lines of code will light up the same user LEDs?

Code using Binary	Code using Decimal
<code>leds.user(0b00001100)</code>	<code>leds.user(12)</code>
<code>leds.user(0b00000000)</code>	<code>leds.user(0)</code>
<code>leds.user(0b00001110)</code>	<code>leds.user(14)</code>
<code>leds.user(0b00010011)</code>	<code>leds.user(19)</code>
<code>leds.user(0b00011000)</code>	<code>leds.user(24)</code>
<code>leds.user(0b01010101)</code>	<code>leds.user(85)</code>
<code>leds.user(0b10101010)</code>	<code>leds.user(170)</code>
<code>leds.user(0b11111111)</code>	<code>leds.user(255)</code>

Match this code:

`leds.user(14)`
`leds.user(85)`
`leds.user(12)`
`leds.user(170)`
`leds.user(0)`
`leds.user(24)`
`leds.user(255)`
`leds.user(19)`

For extra practice, try this game: <https://studio.code.org/projects/applab/iukLbcDnzqgoxuu810unLw>