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| **AP CSP Python with Robots**  **Binary Numbers Activity Guide** | | | **Name:** | | |
| **Warm Up** How many ways can you represent “7”? | | | | | |
|  | | | | | |
| **Activity #1** Watch the video: [Secret Coders video](https://www.youtube.com/watch?v=bva4N7hNrNs) | | | | | |
| **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 |  | | 0010 | |  |
| 4 |  | | 0110 | |  |
| 8 |  | | 1001 | |  |
| 13 |  | | 1110 | |  |
| **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 |  | | 5 | |  |
| 0001 1100 |  | | 12 | |  |
| 0010 0000 |  | | 30 | |  |
| 1010 0001 |  | | 100 | |  |
| 0011 0110 |  | | 153 | |  |
| **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 | |  | |  | |
| 12 | |  | |  | |
| 30 | |  | |  | |
| 100 | |  | |  | |
| 153 | |  | |  | |
| **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** |  | **Match this code:** |
| leds.user(0b00001100) |  |  | leds.user(14) |
| leds.user(0b00000000) |  |  | leds.user(85) |
| leds.user(0b00001110) |  |  | leds.user(12) |
| leds.user(0b00010011) |  |  | leds.user(170) |
| leds.user(0b00011000) |  |  | leds.user(0) |
| leds.user(0b01010101) |  |  | leds.user(24) |
| leds.user(0b10101010) |  |  | leds.user(255) |
| leds.user(0b11111111) |  |  | leds.user(19) |

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