BITS & BYTES

AP Computer Science Principles - Unit 1

Peel the Problem

Imagine.....

You're stranded on a deserted island with a group of monkeys and a plentiful banana supply.

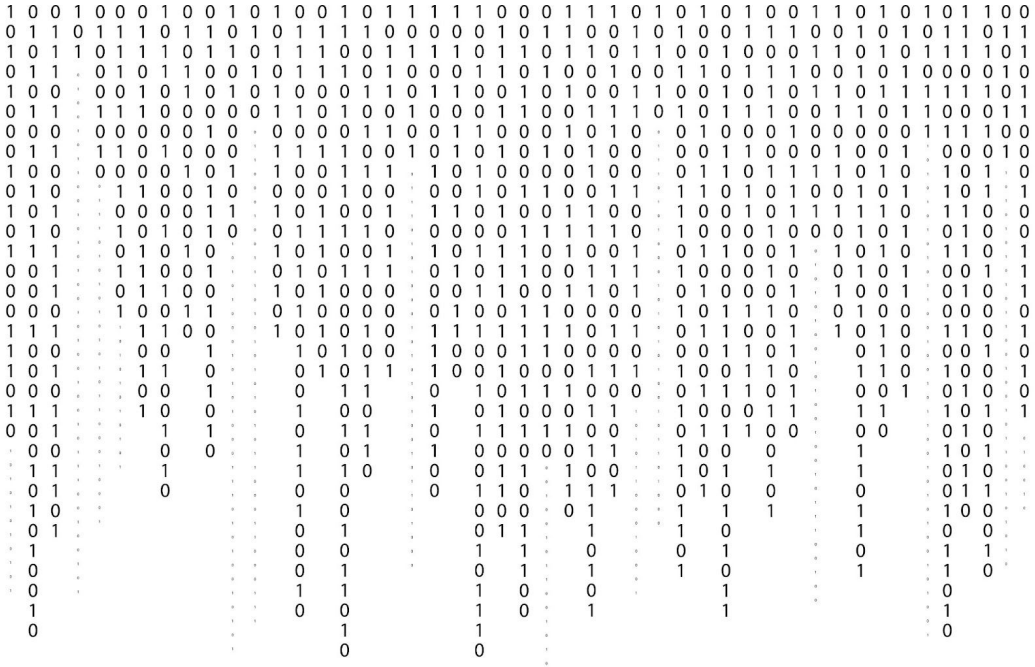
How can you use the monkeys and bananas to send a message for help?

Consider things like the number of bananas, how the monkeys are positioned, or any actions they might perform.

Lesson

The Language of Computers

Binary Number System



- Language of 0s and 1s that tells computers what to do.
- All information computers use, from text to pictures, is ultimately stored and processed in binary

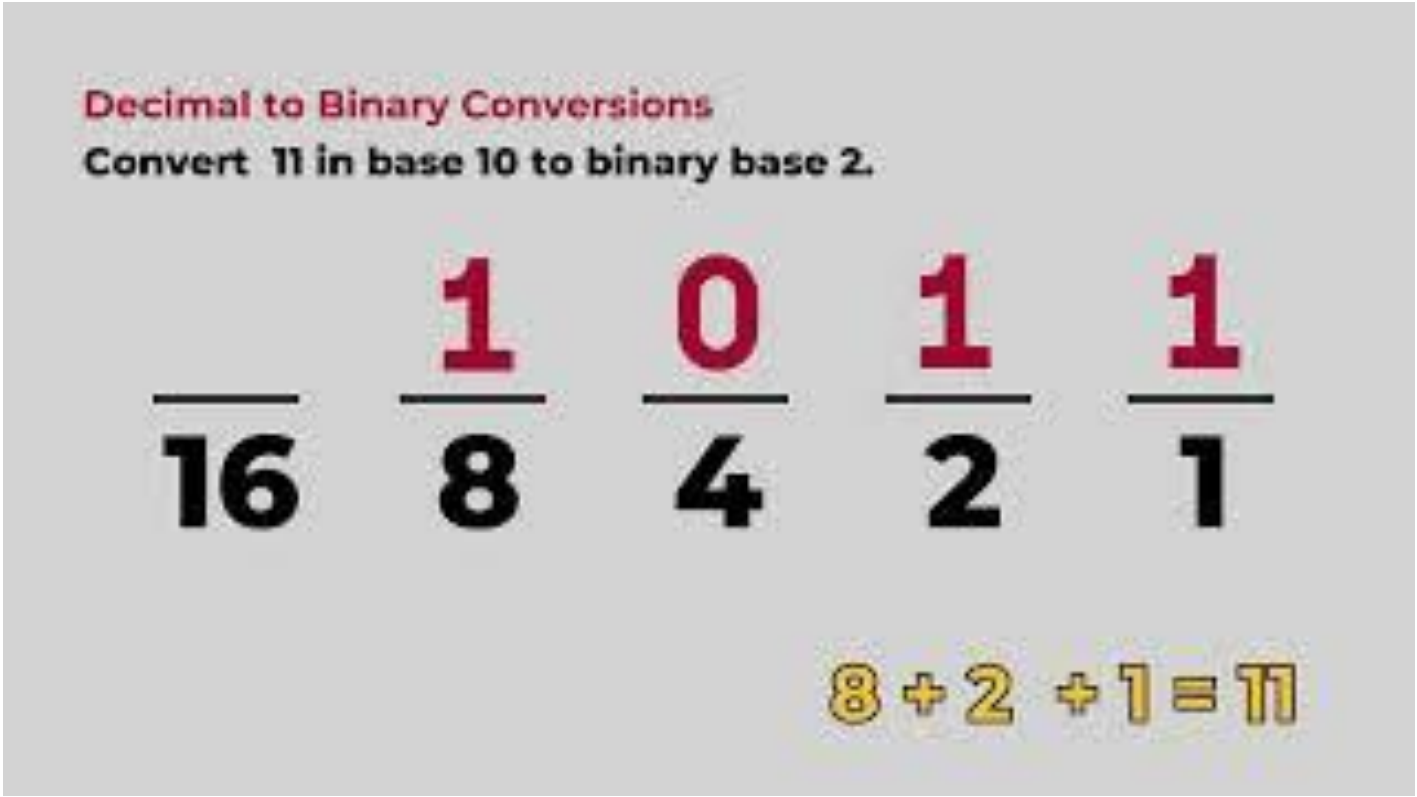
Decimal Number System

Base-10 Decimal Number System			
1	2	3	4
1000	100	10	1
10^3	10^2	10^1	10^0

Binary Number System

Base-2 Binary Number System							
128	64	32	16	8	4	2	1
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

Converting Decimal to Binary



Check for Understanding

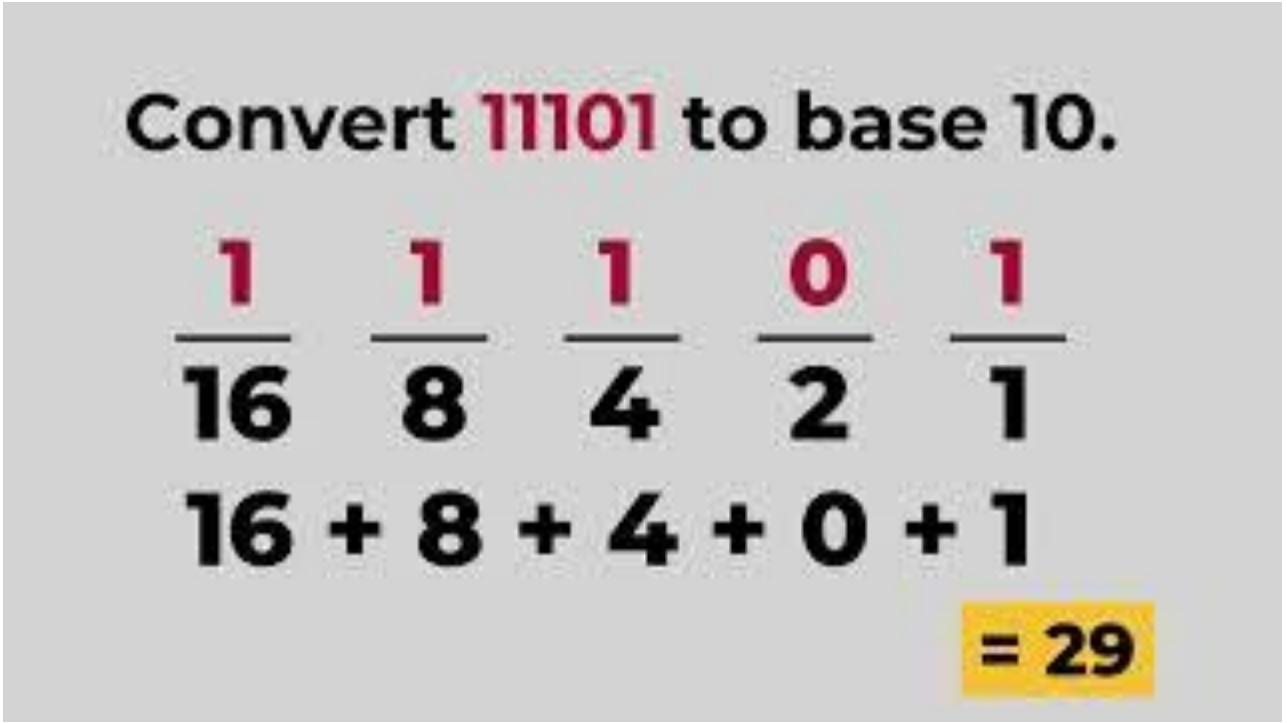
Convert the following numbers in base-10 into binary (base-2) 42

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1
0	0	1	0	1	0	1	0

42	42	42	10	10	2	2	0
-128	-64	-32	-16	-8	-4	-2	-1
X	X	10	X	2	X	0	X

Binary
101010_2

Converting Decimal to Binary



Check for Understanding

Convert the following numbers in base-10 into binary (base-2): 10111010

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1
1	0	1	1	1	0	1	0

128 + 0 + 32 + 16 + 8 + 0 + 2 + 0

Decimal:
186

Number of Bits Needed

Go Bananas! Activity

Binary War

Decks are 20 cards for each pair of students. Shuffle the deck of binary playing cards.

Each student should be dealt half of the deck of cards. Students should not look at their cards.

Students will each flip over a card from their deck and then determine who has the higher value. That student gets both cards and places them on the bottom of their deck.

If the values are equal then students will turn over the next card to determine who wins.

Students continue game play until one student has the whole deck of cards.

Assessment

Assessment Details

Complete the assessment at the end of the unit on CodeMonkey.