Functions

- Functions
- Data Types
- Variables and Scopes

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BT-4: Criminal Cupbearers

An evil king has 1000 bottles of wine. A neighboring queen plots to kill the bad king, and sends a servant to poison the wine. The king's guards catch the servant after he has only poisoned one bottle. The guards don't know which bottle was poisoned, but they do know that the poison is so potent that even if it was diluted 1,000,000 times, it would still be fatal. Furthermore, the effects of the poison take one month to surface. The king decides he will get some of his prisoners in his vast dungeons to drink the wine. **Rather than using 1000 prisoners each assigned to a particular bottle, this king knows that he needs to murder no more than 10 prisoners to figure out what bottle is poisoned, and will still be able to drink the rest of the wine in 4 weeks 1 day time. How does he pull this off**?

CODING BLOCKS

Why binary number system?

- We humans use a decimal, or base-10, numbering system, presumably because people have 10 fingers

- Early computers were designed around the decimal numbering system. This approach made the creation of computer logic capabilities unnecessarily complex and did not make efficient use of resources. (For example, 10 vacuum tubes were needed to represent one decimal digit.)

- To deal with the basic electronic states of on and off, Von Neumann suggested using the binary numbering system
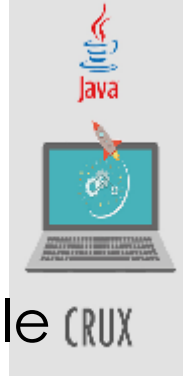
CODING
BLOCKS

What is binary number system

- The binary, or base-2, numbering system is based on the same principles as the decimal, or base-10, numbering system, with which we are already familiar

- Bit(Binary Digit) is the basic unit. It can have only one of two values (0 or 1), and may therefore be physically implemented with a two-state device.

- Bits are commonly stored and manipulated in groups generally referred as Byte (group of 8 bits)

- Number of bits effect accuracy of result and also limits the size of numbers manipulated by computer.

CODING
BLOCKS

Other Number Systems

- Hexadecimal Number System (base 16)
- Octal Number System (base 8)

BT – 7: Infinite Quarter Sequence

You are wearing a blindfold and thick gloves. An infinite number of quarters are laid out before you on a table of infinite area. Someone tells you that 20 of these quarters are tails and the rest are heads. He says that if you can split the quarters into 2 piles where the number of tails quarters is the same in both piles, then you win all of the quarters. You are allowed to move the quarters and to flip them over, but you can never tell what state a quarter is currently in (the blindfold prevents you from seeing, and the gloves prevent you from feeling which side is heads or tails). **How do you partition the quarters so that you can win them all?**

Primitive Data Types

- Boolean - boolean
- Character - char
- Integer – long, int, short, byte
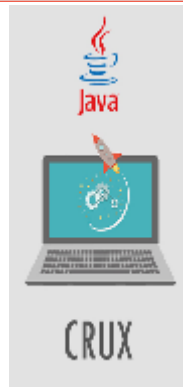- Floating Point – float
- Double Floating Point – double

CODING BLOCKS

Print table of Fahrenheit to Celsius

Print the following table for Fahrenheit to Celsius using Formula C = (5/9)(F – 32)

0	– 17
20	–6
40	4
60	15
80	26
100	37
120	48
140	60
160	71
180	82
200	93
220	104
240	115
260	126
280	137
300	148

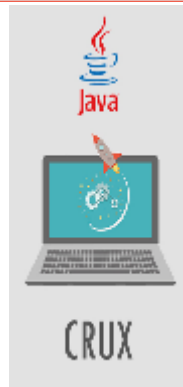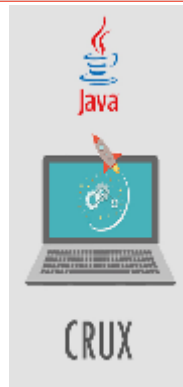CODING BLOCKS

Connectors?
Functions

Why Functions?

Function calls

Variables
and their Scope

Pass by Value

Lets do these problems

- Binary to Decimal
- Decimal to Binary
- Decimal to Octal
- Octal to Decimal
- Any to Any

CODING
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Time to Try?

- Count 5's in a number
- Inverse of a number
- Is number mirror inverse
- Is Armstrong number
- Print all Armstrong numbers from 100 to 999

15

CODING
BLOCKS

Time to Try?

- Return GCD of two numbers
- Return LCM of two numbers
- Power(x, n)
- Log(x, n)

CODING BLOCKS

CRUX

CRUX

CODING BLOCKS

Thank you

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