

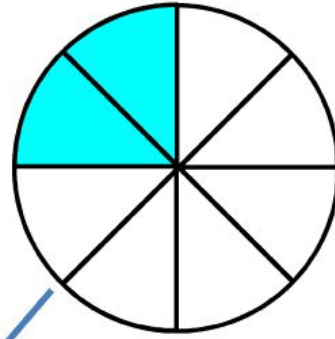
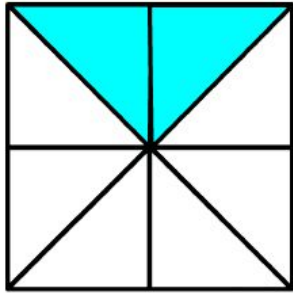
Math

+ - × ÷

Why did or didn't you like  
Math at school?

What's the difference  
between a fraction and a  
decimal?

# Two-eighths



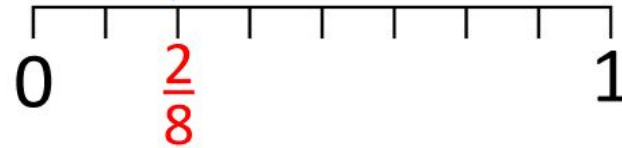
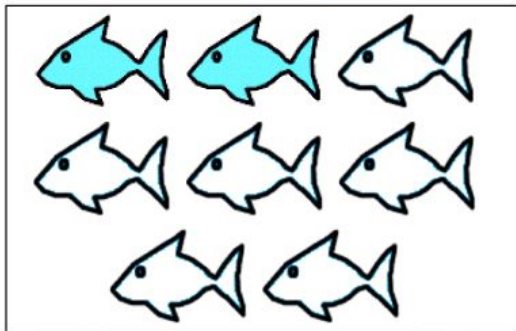
$$\frac{2}{8}$$

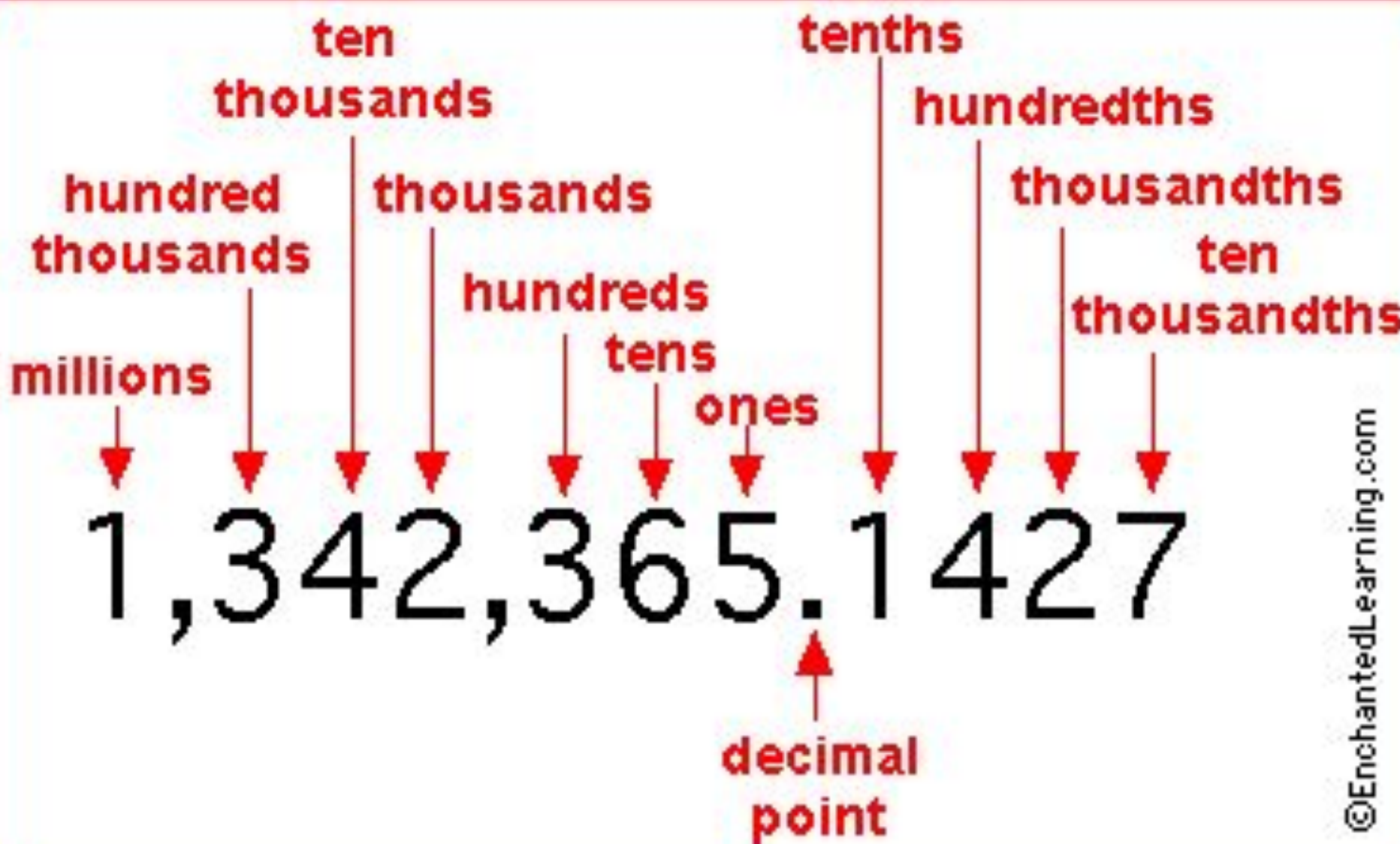
0.25

DECIMAL

25%

PERCENT





Are girls or boys better at  
Math?

Do you think Math is a  
waste of time now, with  
all the computers  
around?

Why do people call Math  
a language? What  
features of a language  
does it have?



Why is mental arithmetic important? Where do we use it?



How can you improve  
mental arithmetic? Have  
you learned a times table  
at school?

Times Table - 12x12

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
<b>1</b>	<b>1</b>	2	3	4	5	6	7	8	9	10	11	12
<b>2</b>	2	<b>4</b>	6	8	10	12	14	16	18	20	22	24
<b>3</b>	3	6	<b>9</b>	12	15	18	21	24	27	30	33	36
<b>4</b>	4	8	12	<b>16</b>	20	24	28	32	36	40	44	48
<b>5</b>	5	10	15	20	<b>25</b>	30	35	40	45	50	55	60
<b>6</b>	6	12	18	24	30	<b>36</b>	42	48	54	60	66	72
<b>7</b>	7	14	21	28	35	42	<b>49</b>	56	63	70	77	84
<b>8</b>	8	16	24	32	40	48	56	<b>64</b>	72	80	88	96
<b>9</b>	9	18	27	36	45	54	63	72	<b>81</b>	90	99	108
<b>10</b>	10	20	30	40	50	60	70	80	90	<b>100</b>	110	120
<b>11</b>	11	22	33	44	55	66	77	88	99	110	<b>121</b>	132
<b>12</b>	12	24	36	48	60	72	84	96	108	120	132	<b>144</b>

Are there times when two  
plus two equals five?

What happens if you  
don't round these  
numbers?

$$2.25 + 2.26 = ?$$





# CHAOS THEORY

In Jurassic Park (1993) a chaos theorist  
Ian Malcolm explains the gist of it:





# Butterfly Effect



Flap of a butterfly's wing in Brazil can set off a cascade of atmospheric events that, weeks later, spurs the formation of a tornado in Texas

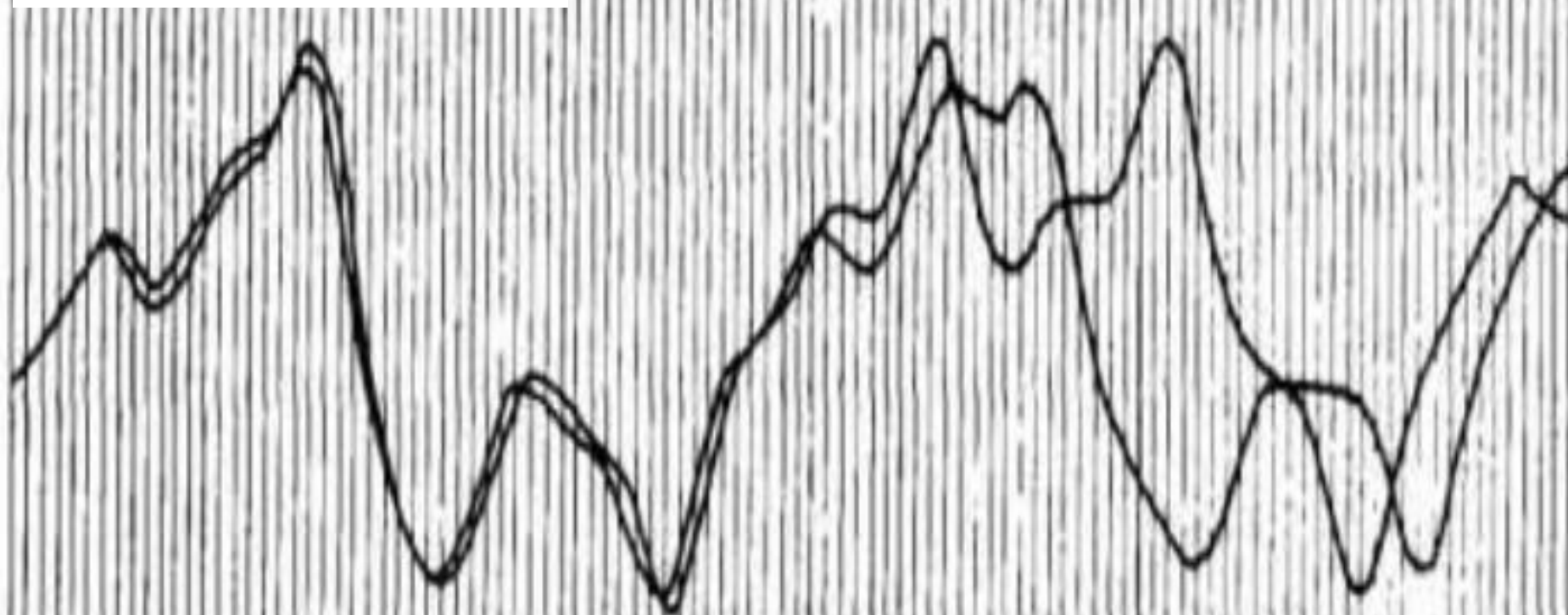




# Edward Lorenz

The Butterfly Man

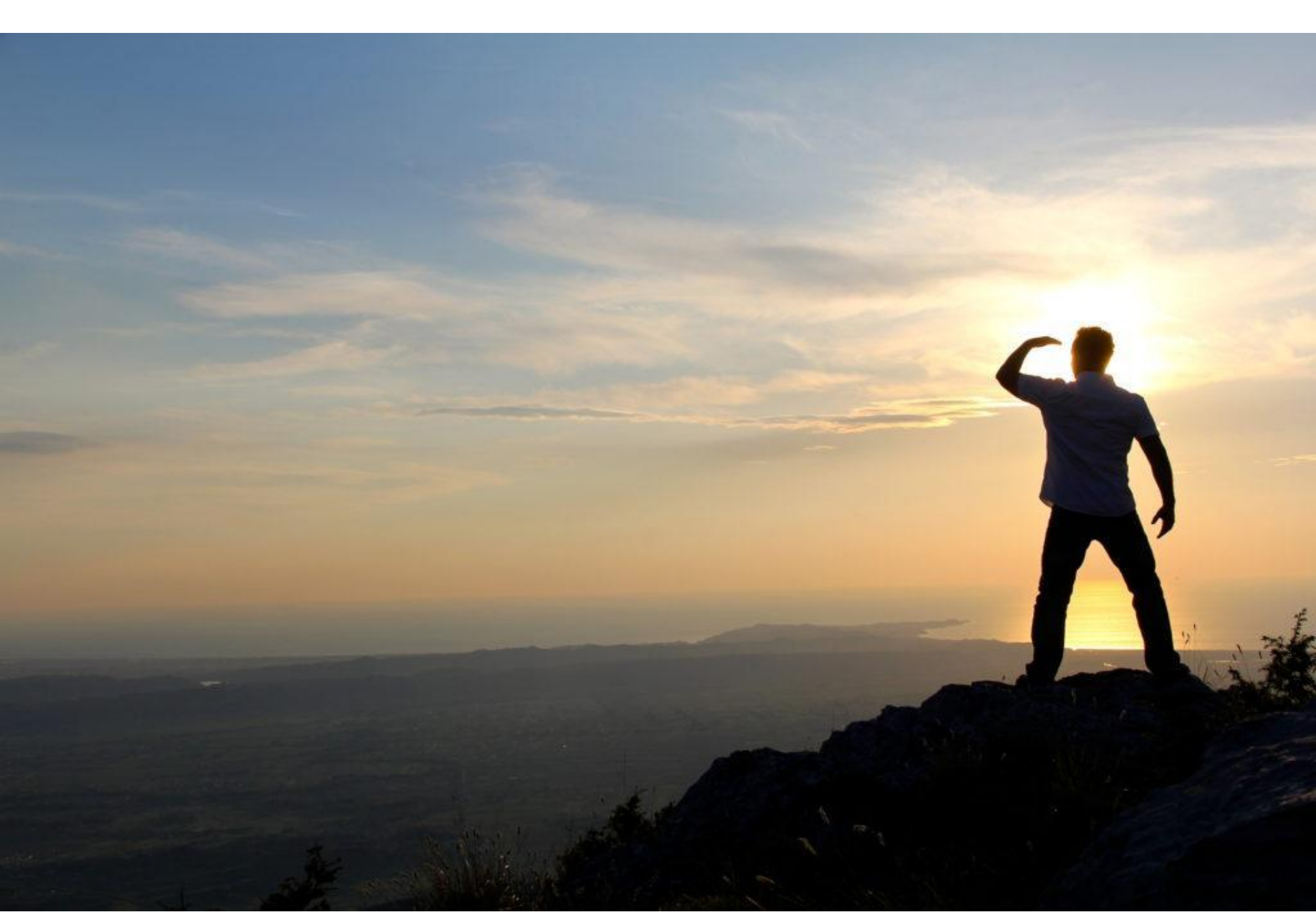
$0.506127 \rightarrow 0.506$



# Prediction Horizon

- a length of time beyond which we can no longer accurately forecast something.

What can affect the  
Prediction Horizon?



Up until 2008 most  
computers were using the  
**IEEE 754-1985**  
calculation standard

IEEE 754-1985 could work  
with 16 decimals

Current 754-2008 generally  
handles up to 32 decimals









How is it possible to  
calculate the  
probabilities?

Why do we need to  
calculate them?

# Quantum computers

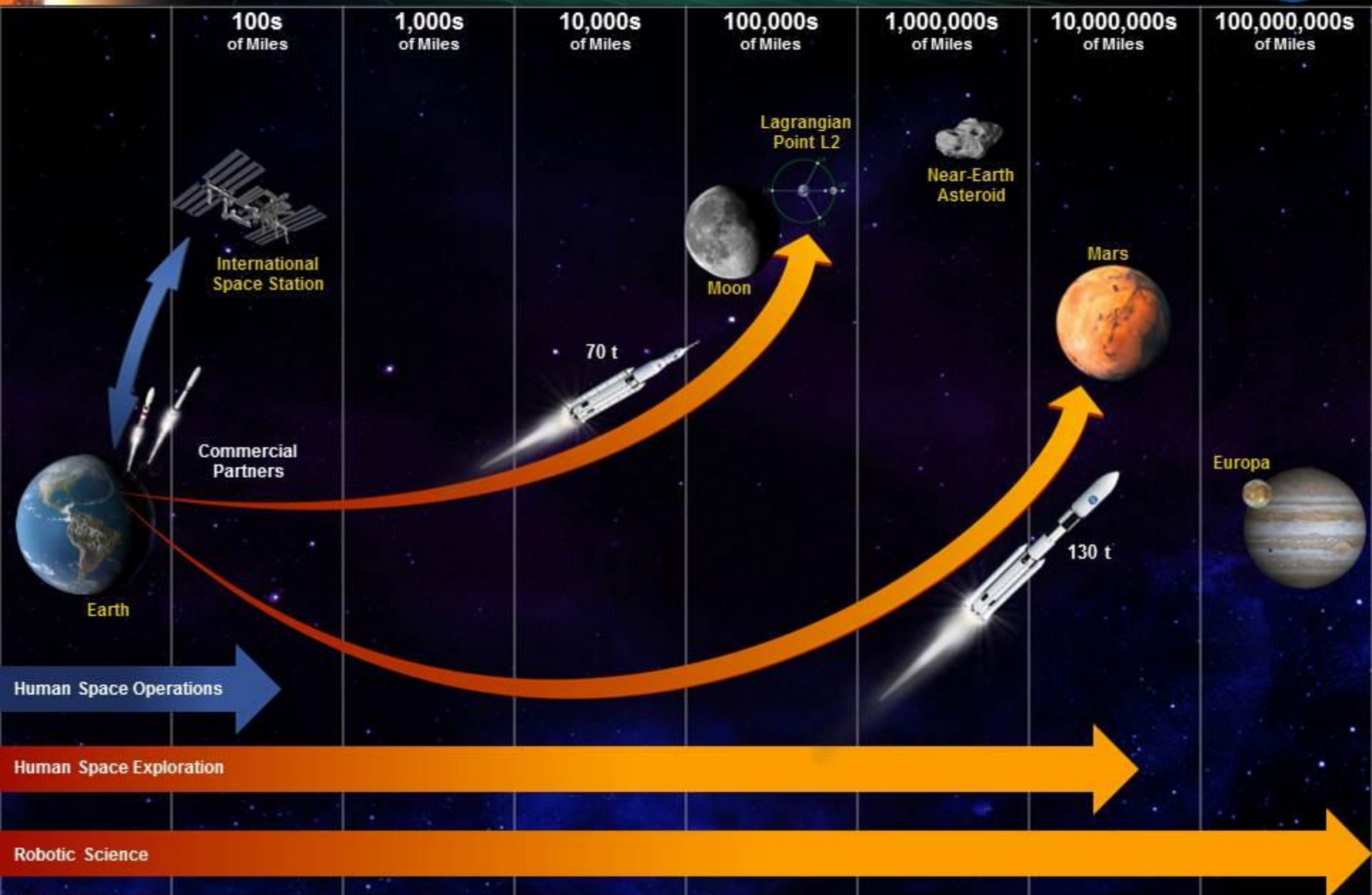


Created from probability  
particles called qu-bits,  
quantum computers aim  
at computing  
probabilities, which linear  
computers can't  
calculate.

# Weather



# The Future of Exploration



100s of Miles

1,000s of Miles

10,000s of Miles

100,000s of Miles

1,000,000s of Miles

10,000,000s of Miles

100,000,000s of Miles



International Space Station

Commercial Partners

Lagrangian Point L2



Moon

70 t



Near-Earth Asteroid



Mars

130 t

Europa



Human Space Operations

Human Space Exploration

Robotic Science



# Banking





# Purchase Behavior





Control Horizon is the length of time which we need to beneficially alter the predicted future

# What is Alertness?







Do you often think about  
what to do if things don't  
go as planned?