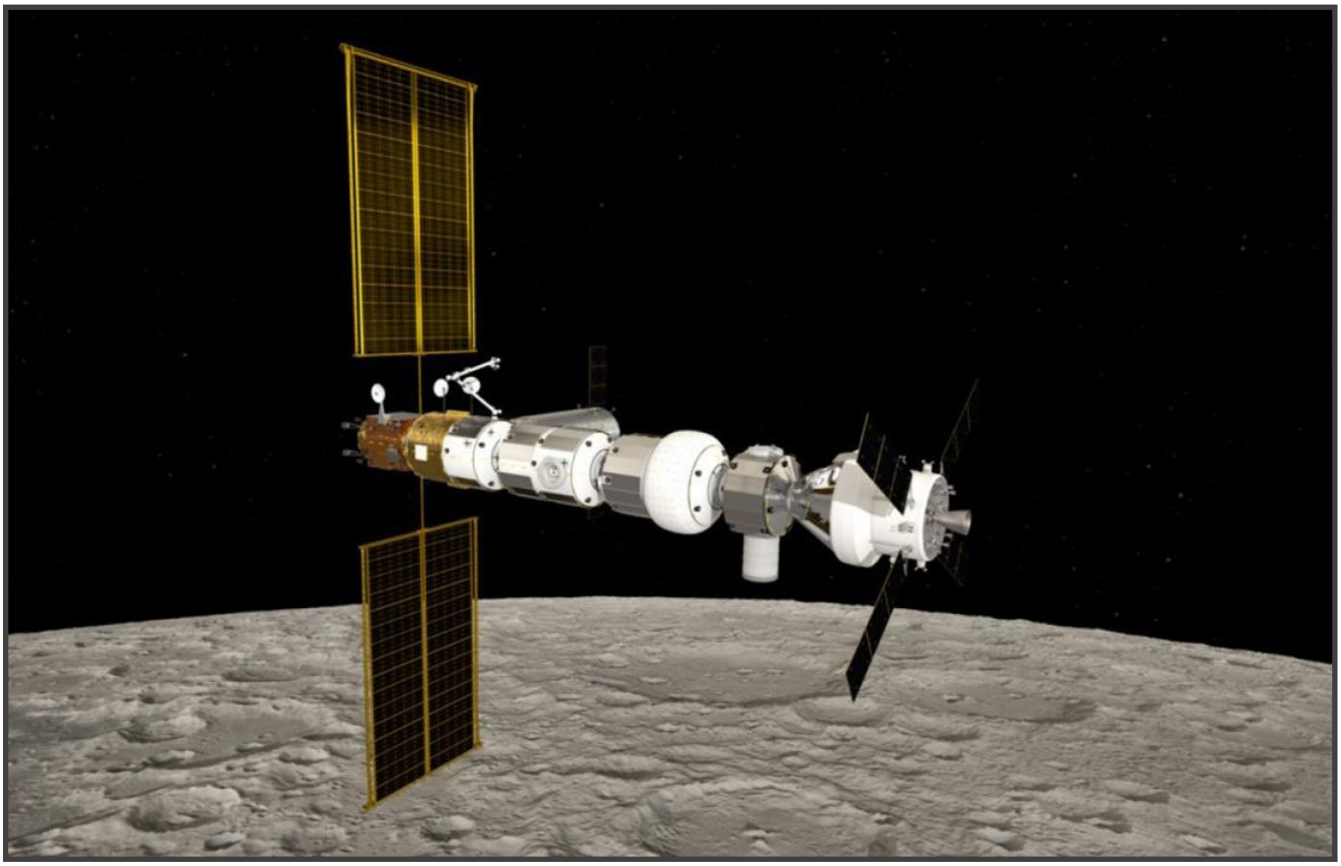
Spacegate Station Academy

Episode 7



Accuracy, Precision and ASCII

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Episode 7 - Accuracy, Precision, and ASCII

Word bank: ***Accurate*** ***Correct*** ***Consistent*** ***Error*** ***Same*** ***True***

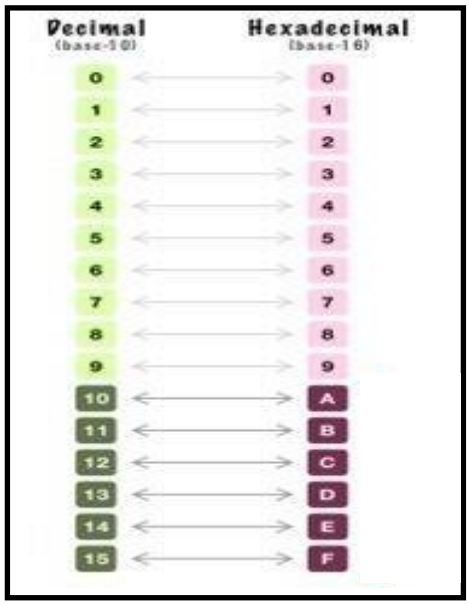
Unit 1 – Accuracy and Precision

1. Accuracy and precision are two important factors when taking data measurements.
2. An accurate measurement has no_____.
3. Accuracy is how close a measured or calculated value is to its_____or_____value.
4. Precision is how_____results are.
5. Involves carrying out a process in the_____manner.
6. Does not relate to how_____the answer is.

Word bank: ***Base 10*** ***Base 16*** ***Binary*** ***Digit*** ***Hexadecimal*** ***Letters*** ***Numbers*** ***Ten***

Unit 2 What is Hexadecimal?

1. Hexadecimal is a_____number system that includes_____and _____
2. Normal counting system is_____where you count in multiples of_____and then add another _____
3. _____System the information is expressed by combinations of 0 and 1.
4. Only takes one_____digit to represent four _____ digits



Binary	Hexadecimal
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010	A
1011	B
1100	C
1101	D
1110	E
1111	F

Work Bank: ***ASCII*** ***Data*** ***Text*** ***Standardized*** ***Characters***

Unit 3 American Standard Code for Information Interchange

1. For_____files to be stored and processed by all computers they must all interpret the _____in the same way.
2. A_____method was created, it defined what numbers should be used.
3. Numbers represented all the_____in the English language.
4. American Standard Code for Information Interchange or _____

Unit 4 The ASCII Table

1. The ASCII table defines all numbers between____and_____.
2. The numbers from_____to_____represent non-printing characters, meaning characters that are not directly displayed. These characters control how the data should be interpreted.

Dec	Hex	Name	Char	Ctrl-char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
0	0	Null	NUL	CTRL-@	32	20	Space	64	40	@	96	60	`
1	1	Start of heading	SOH	CTRL-A	33	21	!	65	41	A	97	61	a
2	2	Start of text	STX	CTRL-B	34	22	"	66	42	B	98	62	b
3	3	End of text	ETX	CTRL-C	35	23	#	67	43	C	99	63	c
4	4	End of xmit	EOT	CTRL-D	36	24	$	68	44	D	100	64	d
5	5	Enquiry	ENQ	CTRL-E	37	25	%	69	45	E	101	65	e
6	6	Acknowledge	ACK	CTRL-F	38	26	&	70	46	F	102	66	f
7	7	Bell	BEL	CTRL-G	39	27	'	71	47	G	103	67	g
8	8	Backspace	BS	CTRL-H	40	28	(	72	48	H	104	68	h
9	9	Horizontal tab	HT	CTRL-I	41	29	)	73	49	I	105	69	i
10	0A	Line feed	LF	CTRL-J	42	2A	*	74	4A	J	106	6A	j
11	0B	Vertical tab	VT	CTRL-K	43	2B	+	75	4B	K	107	6B	k
12	0C	Form feed	FF	CTRL-L	44	2C	,	76	4C	L	108	6C	l
13	0D	Carriage feed	CR	CTRL-M	45	2D	-	77	4D	M	109	6D	m
14	0E	Shift out	SO	CTRL-N	46	2E	.	78	4E	N	110	6E	n
15	0F	Shift in	SI	CTRL-O	47	2F	/	79	4F	O	111	6F	o
16	10	Data line escape	DLE	CTRL-P	48	30	0	80	50	P	112	70	p
17	11	Device control 1	DC1	CTRL-Q	49	31	1	81	51	Q	113	71	q
18	12	Device control 2	DC2	CTRL-R	50	32	2	82	52	R	114	72	r
19	13	Device control 3	DC3	CTRL-S	51	33	3	83	53	S	115	73	s
20	14	Device control 4	DC4	CTRL-T	52	34	4	84	54	T	116	74	t
21	15	Neg acknowledge	NAK	CTRL-U	53	35	5	85	55	U	117	75	u
22	16	Synchronous idle	SYN	CTRL-V	54	36	6	86	56	V	118	76	v
23	17	End of xmit block	ETB	CTRL-W	55	37	7	87	57	W	119	77	w
24	18	Cancel	CAN	CTRL-X	56	38	8	88	58	X	120	78	x
25	19	End of medium	EM	CTRL-Y	57	39	9	89	59	Y	121	79	y
26	1A	Substitute	SUB	CTRL-Z	58	3A	:	90	5A	Z	122	7A	z
27	1B	Escape	ESC	CTRL-[	59	3B	;	91	5B	[	123	7B	{
28	1C	File separator	FS	CTRL-\	60	3C	<	92	5C	\	124	7C	|
29	1D	Group separator	GS	CTRL-]	61	3D	=	93	5D	]	125	7D	}
30	1E	Record separator	RS	CTRL-^	62	3E	>	94	5E	^	126	7E	~
31	1F	Unit separator	US	CTRL-_	63	3F	?	95	5F	_	127	7F	DEL

ASCII Table Practice

The computer terminal that allows direct data input to the maneuvering engines on Spacegate Station only accepts hexadecimal data input for processing the commands to operate. Normally, this input is transferred to the computer terminal automatically by the Station's Navigation Computer, which receives its information from Mission Control.

Instructions: You will now practice converting the command values used to program the stations maneuvering Engines into hexadecimal data so this information can be entered directly into the computer.

Command 1, **Command 2**, and **Command 3** represent instructions that identify what the computer will be doing with the primary data for the engines. The **Values** represents information the engines need to perform the burn procedure which can include navigation coordinates or burn time.

Covert each line (Command 1, Command 2, Value, and Command 3) into hexadecimal data using the ASCII table provided. Do not place spaces or commas between numbers.

Problem 1

Input Data	Command 1	Command 2	Value	Command 3	ASCII Code
Present Orbit Location	Start of Text	Device Control 1	K27	Carriage Return	
Desired Orbit Location	File Separation	Device Control 2	M27	Null	
Burn Time			126		

Problem 2

Input Data	Command 1	Command 2	Value	Command 3	
Present Orbit Location	Start of Text	Device Control 1	J21	Carriage Return	
Desired Orbit Location	File Separation	Device Control 2	M21	Null	
Burn Time			148		

Problem 3

Input Data	Command 1	Command 2	Value	Command 3	ASCII Code
Present Orbit Location	Start of Text	Device Control 1	F14	Carriage Return	
Desired Orbit Location	File Separation	Device Control 2	C14	Null	
Burn Time			212		

ASCII TABLE

Hex	Char	Hex	Char	Hex	Char	Hex	Char
0	[NULL]	20	[SPACE]	40	@	60	`
1	[START OF HEADING]	21	!	41	A	61	a
2	[START OF TEXT]	22	"	42	B	62	b
3	[END OF TEXT]	23	#	43	C	63	c
4	[END OF TRANSMISSION]	24	$	44	D	64	d
5	[ENQUIRY]	25	%	45	E	65	e
6	[ACKNOWLEDGE]	26	&	46	F	66	f
7	[BELL]	27	'	47	G	67	g
8	[BACKSPACE]	28	(	48	H	68	h
9	[HORIZONTAL TAB]	29	)	49	I	69	i
A	[LINE FEED]	2A	*	4A	J	6A	j
B	[VERTICAL TAB]	2B	+	4B	K	6B	k
C	[FORM FEED]	2C	,	4C	L	6C	l
D	[CARRIAGE RETURN]	2D	-	4D	M	6D	m
E	[SHIFT OUT]	2E	.	4E	N	6E	n
F	[SHIFT IN]	2F	/	4F	O	6F	o
10	[DATA LINK ESCAPE]	30	0	50	P	70	p
11	[DEVICE CONTROL 1]	31	1	51	Q	71	q
12	[DEVICE CONTROL 2]	32	2	52	R	72	r
13	[DEVICE CONTROL 3]	33	3	53	S	73	s
14	[DEVICE CONTROL 4]	34	4	54	T	74	t
15	[NEGATIVE ACKNOWLEDGE]	35	5	55	U	75	u
16	[SYNCHRONOUS IDLE]	36	6	56	V	76	v
17	[ENG OF TRANS. BLOCK]	37	7	57	W	77	w
18	[CANCEL]	38	8	58	X	78	x
19	[END OF MEDIUM]	39	9	59	Y	79	y
1A	[SUBSTITUTE]	3A	:	5A	Z	7A	z
1B	[ESCAPE]	3B	;	5B	[	7B	{
1C	[FILE SEPARATOR]	3C	<	5C	\	7C	|
1D	[GROUP SEPARATOR]	3D	=	5D	]	7D	}
1E	[RECORD SEPARATOR]	3E	>	5E	^	7E	~
1F	[UNIT SEPARATOR]	3F	?	5F	_	7F	[DEL]

Problem 1 Answers

Input Data	Command 1	Command 2	Value	Command 3	ASCII Code
Present Orbit Location	Start of Text	Device Control 1	K27	Carriage Return	**2114B3237D**
Desired Orbit Location	File Separation	Device Control 2	M27	Null	**1C124D32370**
Burn Time			126		**313236**

Problem 2 Answers

Input Data	Command 1	Command 2	Value	Command 3	
Present Orbit Location	Start of Text	Device Control 1	J21	Carriage Return	**2114A3231D**
Desired Orbit Location	File Separation	Device Control 2	M21	Null	**1C124D32310**
Burn Time			148		**313438**

Problem 3 Answers

Input Data	Command 1	Command 2	Value	Command 3	ASCII Code
Present Orbit Location	Start of Text	Device Control 1	F14	Carriage Return	**211463134**
Desired Orbit Location	File Separation	Device Control 2	C14	Null	**1C124331320**
Burn Time			212		**323132**

Next Generation Sunshine State Standards (Florida)

SC.4.N.1.1 Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.

SC.4.N.1.5 Compare the methods and results of investigations done by other classmates.

SC.6.N.1.4 Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.

SC.7.N.1.2 Differentiate replication (by others) from repetition (multiple trials).

SC.7.N.3.2 Identify the benefits and limitations of the use of scientific models.

SC.8.N.1.1 Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

SC.8.E.5.10 Assess how technology is essential to science for such purposes as access to outer space and other remote locations, sample collection, measurement, data collection and storage, computation, and communication of information.