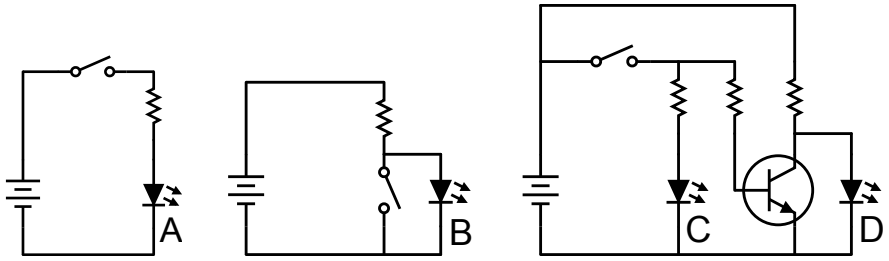
Digital Storage – Octal and Hexadecimal

Data Storage – Zeros and Ones

1. Write the name of a semiconductor device that can be used as a switch and is one of the basic building blocks of modern digital electronic circuits?

2. For the light-emitting diodes (LED) labelled A through D in the circuits to the left, state whether it is "***on***" or "***off***" when the manual switch in the circuit is open and when it is closed closed.



	A	B	C	D
Switch is opened:				
Switch is closed:				

Digital Storage – Number Systems: Octal

3. Count in octal. Write the octal equivalent below each decimal number.

Decimal	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Octal																					

4. Addition and multiplication of octal numbers. Fill in the boxes with the appropriate values.

$$\begin{array}{r} 417 \\ +235 \\ \hline \square\square\square\square \end{array} \qquad \begin{array}{r} 637 \\ +547 \\ \hline \square\square\square\square \end{array} \qquad \begin{array}{r} 765 \\ +567 \\ \hline \square\square\square\square \end{array}$$

$$\begin{array}{r} 376 \\ \times 25 \\ \hline \square\square\square\square \\ \square\square\square\square\square \\ \hline \square\square\square\square\square \end{array} \qquad \begin{array}{r} 702 \\ \times 57 \\ \hline \square\square\square\square \\ \square\square\square\square\square \\ \hline \square\square\square\square\square \end{array}$$

Octal Multiplication Table

	1	**2**	**3**	**4**	**5**	**6**	**7**
1	1	2	3	4	5	6	7
2	2	4	6	10	12	14	16
3	3	6	11	14	17	22	25
4	4	10	14	20	24	30	34
5	5	12	17	24	31	36	43
6	6	14	22	30	36	44	52
7	7	16	25	34	43	52	61

5. Show the steps to convert the given octal number into decimal.

$$0362 = 3\times\square + 6\times\square + 2\times\square$$
$$= \square + \square + \square$$
$$= \square$$

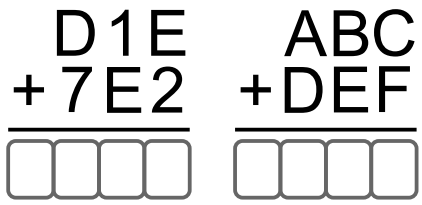
Digital Storage – Octal and Hexadecimal

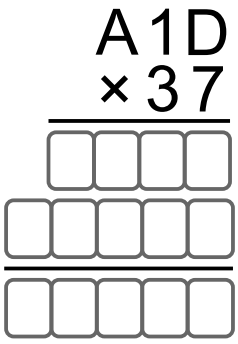
Digital Storage – Number Systems: Hexadecimal

6. Count in hexadecimal. Write the hexadecimal equivalent below each decimal number.

Decimal	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Hexadecimal																					

7. Addition and multiplication of hexadecimal numbers. Fill in the boxes with the appropriate values.

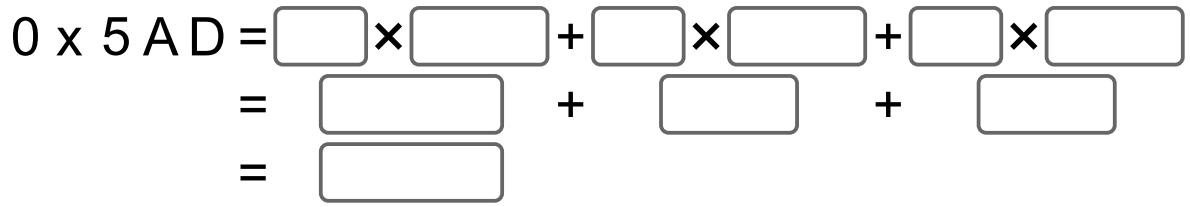




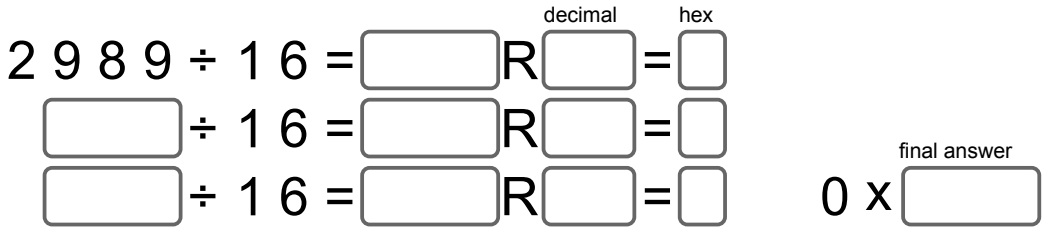
Hexadecimal Multiplication Table

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
1	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
2	2	4	6	8	A	C	E	10	12	14	16	18	1A	1C	1E
3	3	6	9	C	F	12	15	18	1B	1E	21	24	27	2A	2D
4	4	8	C	10	14	18	1C	20	24	28	2C	30	34	38	3C
5	5	A	F	14	19	1E	23	28	2D	32	37	3C	41	46	4B
6	6	C	12	18	1E	24	2A	30	36	3C	42	48	4E	54	5A
7	7	E	15	1C	23	2A	31	38	3F	46	4D	54	5B	62	69
8	8	10	18	20	28	30	38	40	48	50	58	60	68	70	78
9	9	12	1B	24	2D	36	3F	48	51	5A	63	6C	75	7E	87
A	A	14	1E	28	32	3C	46	50	5A	64	6E	78	82	8C	96
B	B	16	21	2C	37	42	4D	58	63	6E	79	84	8F	9A	A5
C	C	18	24	30	3C	48	54	60	6C	78	84	90	9C	A8	B4
D	D	1A	27	34	41	4E	5B	68	75	82	8F	9C	A9	B6	C3
E	E	1C	2A	38	46	54	62	70	7E	8C	9A	A8	B6	C4	D2
F	F	1E	2D	3C	4B	5A	69	78	87	96	A5	B4	C3	D2	E1

8. Show the steps to convert the given hexadecimal number into decimal.



9. Show the steps to convert the given decimal number into hexadecimal using the division method.



10. Convert the hexadecimal numbers to decimal, and the decimal number to hexadecimal: Show your work in the box.

a)	**0x63**	c)	**127**
b)	**0xF1**	d)	**273**