CS 42 C++ Programming Essentials

Term: Summer 2018, eC Academy

Project 1: Hexadecimal Multiplication Table.

1. **Project Description:**
   To generate the multiplication table of a number (entered by the user) using for loop.

   Table look up is always the fastest way to find solution for multiplication. In this project, you will bs using C++ language to write multiplication table of different radix systems. Only C++ style cout and cin are allowed. Even though you may use #include <cstdio> or #include <cstdlib> to call the C language **printf** or **scanf** functions. They are not allowed in this project. Please use C++ <iostream> only. You may use other C++ library functions but not C language libraries.

2. Part 1: Please design a simple 9x9 multiplication table generator, named **mt99.cpp**. Its output table should look likes:

1	2	3	4	5	6	7	8	9
2	4	6	8	10	12	14	16	18
3	6	9	12	15	18	21	24	27
4	8	12	16	20	24	28	32	36
5	10	15	20	25	30	35	40	45
6	12	18	24	30	36	42	48	54
7	14	21	28	35	42	49	56	63
8	16	24	32	40	48	56	64	72
9	18	27	36	45	54	63	72	81

   Hint: this can be down by nested loop. You may need to set precision properly.

3. Part 2: Please design a radix-8 (base-8, octal) multiplication table generator, named mt8.cpp. Its output table should look like:

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

   Hint: a converter function from an integer to radix-8 string is required.

4. Please design a radix-16 (base-16, hexadecimal) multiplication table generator, named mt16.cpp. Its output table should look like:

1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
2	4	6	8	a	c	e	10	12	14	16	18	1a	1c	1e
3	6	9	c	f	12	15	18	1b	1e	21	24	27	2a	2d
4	8	c	10	14	18	1c	20	24	28	2c	30	34	38	3c
5	a	f	14	19	1e	23	28	2d	32	37	3c	41	46	4b
6	c	12	18	1e	24	2a	30	36	3c	42	48	4e	54	5a
7	e	15	1c	23	2a	31	38	3f	46	4d	54	5b	62	69
8	10	18	20	28	30	38	40	48	50	58	60	68	70	78
9	12	1b	24	2d	36	3f	48	51	5a	63	6c	75	7e	87
a	14	1e	28	32	3c	46	50	5a	64	6e	78	82	8c	96
b	16	21	2c	37	42	4d	58	63	6e	79	84	8f	9a	a5
c	18	24	30	3c	48	54	60	6c	78	84	90	9c	a8	b4
d	1a	27	34	41	4e	5b	68	75	82	8f	9c	a9	b6	c3
e	1c	2a	38	46	54	62	70	7e	8c	9a	a8	b6	c4	d2
f	1e	2d	3c	4b	5a	69	78	87	96	a5	b4	c3	d2	e1

Hint: a converter function from an integer to radix-16 string is required.