Problem set 6

November 1, 2019

1 6.1

1.1 a

Converting all hexadecimal numbers to their representation in ascii:
start*
Simplicity, carried to the extreme, becomes elegance.
- Jon Franklin

end*

1.2 b

UTF - 8	Unicode	Name
7c	U+007C	Vertical Line
2b	U+007B	Left curly bracket
7d	U+007D	Right Curly bracket
e2	U+00E2	Latin small letter with circumflex
88	U+0088	Character tabulation set
aa	U+00AA	Feminine ordinal indicator
92	U+0092	Private Use Two
c2	U+00C2	Latin capital letter A with circumflex
ad	U+00AD	Soft Hyphen
80	U+0080	Euro Sign
93	U+0093	Set Transmit State
91	U+0091	Private Use One
94	U+0094	Cancel Character
20	U+0020	Space
3d	U+003D	Equals Sign
37	U+0037	Digit 7
0a	U+000A	Line Feed

1.3 c

For a chinease text with 800,000 characters in UTF-32,
One character takes 4 bytes to be stored.
Total Bytes = 800,000 * 4 i.e. 3,200,000 bytes.

In UTF-8, chinease characters fall undeer the code block U+4E00 to U+9FFF. This falls under the section U+0800 till U+FFFF which requires 3 bytes to encode a character.
Total bytes = 800,000 * 3 i.e. 2,400,000 bytes.

2 6.2

2.1 a

No.	Date and Time
1	2019-10-15 T 15:15:00 +02:00
2	2019-10-13 T 17:15:00 +00:00
3	2019-10-13 T 13:15:00 +00:00
4	2019-10-13 T 15:15:00 -02:00
5	2019-10-13 T 00:30:00 -12:45
6	2019-10-15 T 05:15:00 +12:00

We convert all the times to UTC and compare them:

No.	Date and Time
1	2019-10-15 T 13:15:00 +00:00
2	2019-10-13 T 17:15:00 +00:00
3	2019-10-13 T 13:15:00 +00:00
4	2019-10-13 T 17:15:00 -00:00
5	2019-10-13 T 13:15:00 -00:00
6	2019-10-15 T 17:15:00 +00:00

Thus we conclude:
2 and 4 are the same times.
3 and 5 are the same times.

2.2 b

It is useful to see if the conversion to UTF was done from which time zone.

2.3 c

The year 2038 problem arises from how dates are stored. If we store dates as the number of seconds that has passed since 1 January 1970, and use a limited amount of space to store that information, eventually the memory will reach maximum capacity and then overflow. This means after the year 2038 will overflow the storage and the computes will go back to displaying 1 January 1970 as the date. One solution to this problem is to allocate more bits to store the information.
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