

Encoding 3 sample manual work

- IEEE 754 hex F3 58 00 00

→ binary 1111 0011 0101 1000 0000 0000 0000 0000

regroup 1 1110 0110 101 1000 0000 0000 0000 0000

$$s=1, e = E6 \text{ hex} = 1,3,7,14,28,57,115, 230 \text{ decimal}$$

$$\therefore \text{binary scientific} = -1.1011 \times 2^{230-127} = -1.1011 \times 2^{103}$$

- binary scientific 1.01×2^{-29} : $s=0$; $-29 = e - 127$, $e = 98 \text{ decimal} = 62 \text{ hex}$

i. IEEE 754 binary = 0 0110 0010, 010 0000 0000 0000 0000 0000

regroup 0011 0001 0010 0000 0000 0000 0000 0000

$$\text{hex} = 31200000$$

$$\begin{array}{r} 3 \\ \times 68 = 52 \\ \hline 48 + 4 \\ \hline 3 \end{array} \quad \downarrow$$

- binary scientific -1.1101×2^{-203} : $s=1$; $-203 = e - 1023$, $e = 820 \text{ decimal} = 334 \text{ hex}$

\therefore IEEE 754 binary = 1 011 0011 0100 1101, 48 zero's;

$$\text{hex} = B3 4D 00 00 00 00 0B 00$$

UTF-32 = 0000007E, codepoint = U+007E, (UTF-16 = 007E, UTF-8 = 7E)

codepoint = U+03D7, (UTF-32 = 000003D7), UTF-8 → 3D7 = 0011 10101011 11 bits

encode 110 01111 10 0101011

regroup 1100 1111 1001 0111 = CF 97 hex

Codepoint = U+0075, (UTF-8 = 75) character (via web search) = LATIN SMALL LETTER U

glyph = u

UTF-32 = 00002286, (UTF-16 = 2286), UTF-8 → 0010 0010 1000 0110, 16 bits

encode 1110 0010 10 0010 10 10 00 0110 = E2 8A 86 hex

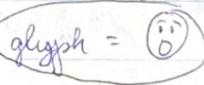
Encoding 3 sample manual work page 2

UTF-32 = 00002253, codepoint = U+2253, UTF-8 → 0010/0010 0101 0011, 16 bits
 encode 1110 0010 10 0010 01 1001 0011 = E2 89 93 hex

UTF-16 = 00DF, UTF-32 = 000000DF, UTF-8 → 1101 1111, 11 bits = 000 1101 1111
 encode 110 000 11 10 01 1111
 regroup 1100 0011 1001 1111 = C3 9F hex

UTF-8 = F0 9F 80 87 ; decode 1111 0000 1001 1111 1000 0000 1000 0111
 000 01 1111 00 0000 00 0111
 regroup 0 0001 1111 0000 0000 0111
 = 1F007 hex, codepoint = U+1F007

UTF-16 encode → let $y = 1F007 - 10000 = F007$ = 1111 0000 0000 0111
 = 110110 00 0011 1100 110111 60 0000 0111 binary
 = D8 3C DC 07 hex

codepoint = U+1F632, UTF-32 = 0001F632, character (via web search) = ASTONISHED FACE
 glyph = 

UTF-8 = F0 9F 81 AB ; decode 1111 0000 1001 1111 1000 0001 1010 1011
 000 01 1111 00 0001 10 1011
 regroup 0 0001 1111 0000 0110 1011
 = 1F06B hex, UTF-32 = 0001F06B

UTF-16 encode → let $y = 1F06B - 10000 = F06B$ = 0000 1111 0000 0110 1011
 = 110110 00 0011 1100 110111 00 0110 1011
 = D8 3C DC 6B hex

Encoding 3 sample manual work page 3

Codepoint = U+1F601, $\text{UTF-32} = 0001\text{F601}$, character (via web search) = GRINNING FACE WITH SMILING EYES
glyph =

assembly instruction = IN stdin
 \downarrow \downarrow
2 164 → machine instruction = 20000164

assembly instruction = MOD counter
 \downarrow \downarrow
8 C3E → machine instruction = 80000C3E

machine instruction = DO 208520
JZ ↓
lookup → assembly instruction = JZ lookup

machine instruction = 40208520
ADD ↓
lookup → assembly instruction = ADD lookup

machine instruction = 10000C3E → assembly instruction = STORE counter
STORE ↓
counter