

\* Simulator project should be GUI-based and can run stand-alone/executable (except for MATLAB implementation)

**Deadline:** Submission of source code via CANVAS on November 18, 2019 (filename should include your surname)

**Demo:** November 19, 2019 - class time

**Topics:**

1. Unicode Generator

- Input: hex Unicode (code point)
  - e.g., U+20AC
- Outputs (hex):
  - UTF-8 (e.g., E2 82 AC)
  - UTF-16 (e.g., 20 AC)
  - UTF-32 (e.g., 00 00 20 AC)

2. IEEE-754 Decimal-32 and Decimal-64 Floating Point Converter (including all special cases)

- Input (or Output):
  - Decimal number (e.g.,  $-9456128 \times 10^{-20}$ )
- Outputs:
  - Binary output, in separate fields (i.e., S CCCCC EEEEEEE MMMMMMMMMM MMMMMMMMMM;  
e.g., 1 11011 010001 1001010110 0010101000)
  - and Hexadecimal (e.g., ED1958A8)

*Note: The above examples are for Decimal-32 only. Your GUI may include an input for “mode” selection, i.e., Decimal-32 mode or Decimal-64 mode.*

3. IEEE-754 Binary-32 and Binary-64 floating point converter (including all special cases)

- Input:
  - sign, decimal exponent and binary mantissa, (e.g.,  $+111.0000 \times 2^{-2}$ )
- Output:
  - Binary output, in separate fields (i.e., S EEEEEEE FFFFFFFFFFFFFFFFFFFFFFFF  
e.g., 0 01111111 110000000000000000000000)
  - Hexadecimal (e.g., 3FE00000)

*Note: The above examples are for single precision only. Your GUI may include an input for “mode” selection, i.e., single precision mode, or double precision mode.*