

Tool For Generating Automated Academic Web Apps

Empowering The Novice Author

..Questions:: The number -65 in 2s complement is represented with eight bits as 1011 1111. What is the representation using 10 bits instead?

- I need to re-calculate again the encoding of 65 with 10 bits and then add one as explained in the translation.
- I just need to add two zeros before the sign and obtain 1000111111
- I just need to add two more ones as the most significant bits: 1110111111
- The number cannot be represented with 10 bits.

..Video:: SeoW3YN03Zs

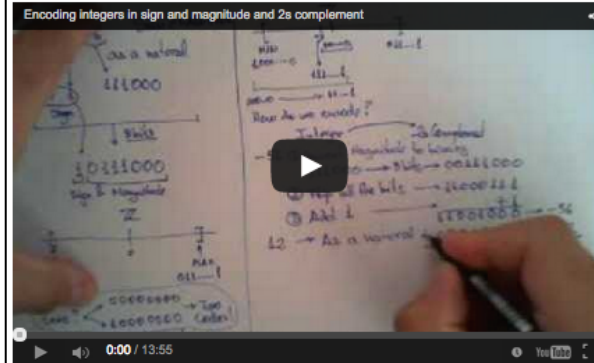
..Notes:: Encoding real numbers with Floating Point Representation

Encoding real numbers using binary logic is significantly more complex than the case of naturals and integers. As we have seen for the case of naturals and integers, when using an encoding with a fixed number of bits, there is a range of numbers that can be represented. But in the case of the real numbers, there are infinite values in that interval. Thus, the representation of real numbers must be restricted to a certain interval **and** to certain values within that interval. This feature of the encoding translates into several issues that need to be solved when operating with these numbers.

Question The number -65 in 2s complement is represented with eight bits as 1011 1111. What is the representation using 10 bits instead?

- A. ☐ I need to re-calculate again the encoding of 65 with 10 bits and then add one as explained in the translation.
- B. ☐ I just need to add two zeros before the sign and obtain 1000111111
- C. ☐ I just need to add two more ones as the most significant bits: 1110111111
- D. ☐ The number cannot be represented with 10 bits.

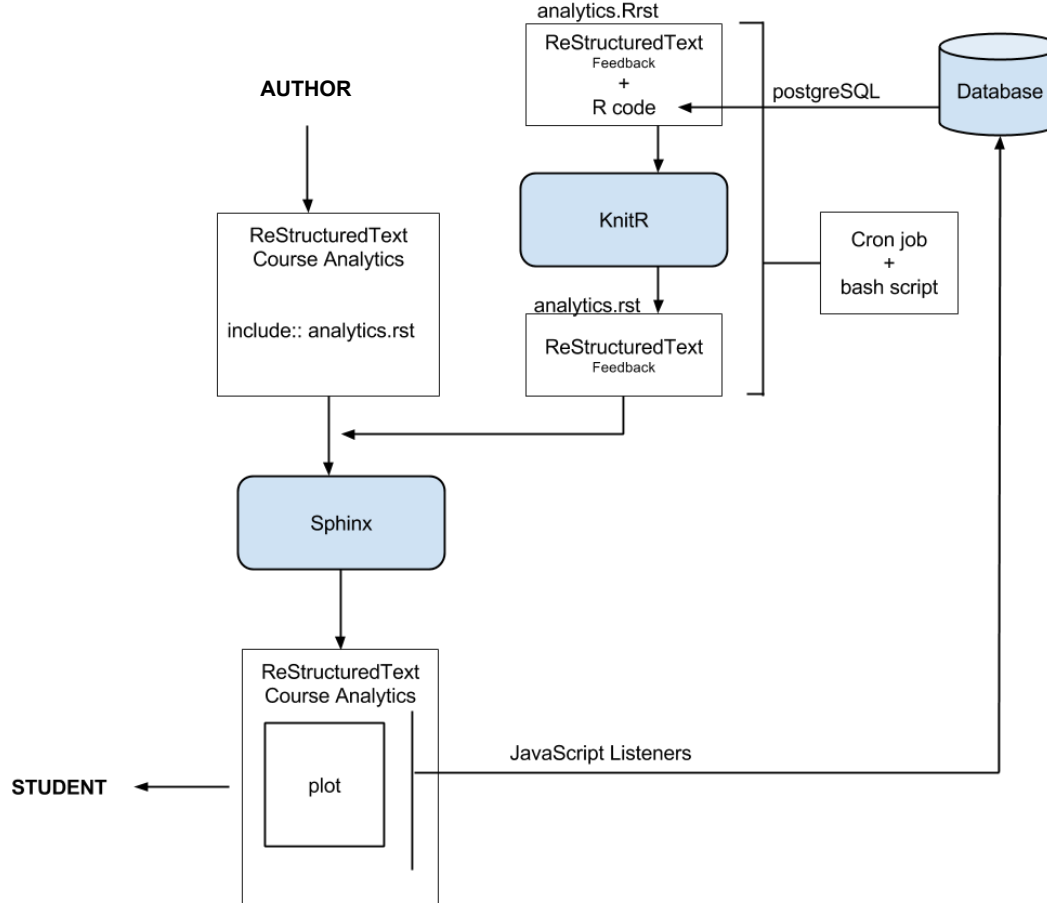
Grade



Encoding Real Numbers with Floating Point Representation

Encoding real numbers using binary logic is significantly more complex than the case of naturals and integers. As we have seen for the case of naturals and integers, when using an encoding with a fixed number of bits, there is a range of numbers that can be represented. But in the case of the real numbers, there are infinite values in that interval. Thus, the representation of real numbers must be restricted to a certain interval **and** to certain values within that interval. This feature of the encoding translates into several issues that need to be solved when operating with these numbers.

The Back Annotation Loop



User Sign In

Username:

45

Password:

••••••

ELEC1601 Computer Systems Weekly Schedule

Welcome to ELEC1601 and introductory course to computer systems. Listed below are the contents of the course.

Contents:

- [Course Organization](#)
- [Course Objectives](#)
- [Course Analytics](#)
- [Week 1: Organization and Computer System Overview](#)
- [Week 2: Information Encoding](#)
- [Week 3: Computer Memory](#)
- [Week 4: Boolean algebra and combinatorial logic](#)
- [Week 5: Sequential circuit design](#)
- [Week 6: Midterm Exam](#)
- [Project Description](#)
- [Week 7: AVR Architecture](#)
- [Week 8: AVR Instruction Set Architecture](#)
- [Week 9: Assembly Programs](#)
- [Week 10: Addressing Modes](#)
- [Week 11: High Level Programming Constructs](#)
- [Week 12: Subroutines](#)
- [Week 13: Exam simulation](#)

Week 2: Information Encoding

How many binary digits are needed to code a hexadecimal digit?

- ☒ 3
- ☐ 2
- ☐ 4
- ☐ 7
- ☐ 1
- ☐ 8

Submit Answer

2.10.3. VIDEO: Review of natural and integer number encoding

Video Analytics

Encoding naturals and integers with binary bits

Naturals

- Base 10: 0...9
- Successive Div / Remainder
- Adding Powers of 2
- Binary Base 2: 0, 1
- Size of bits: $n \text{ bits} \rightarrow 2^n$

Integers

Two cases: Dependent on the sign

Sign & Magnitude

- Values always positive
- Add Sign: $0 \rightarrow +$, $1 \rightarrow -$
- Sign Magnitude: left most bit is SIGN

Two's Complement

- Positive \rightarrow Binary
- Negative
 - 1. Inverts positive values \rightarrow Binary
 - 2. Flip all bits

One's Complement / Base Addition

- Positive \rightarrow Binary
- Negative
 - 1. Inverts positive value \rightarrow Binary
 - 2. Flip the bits
 - 3. Add 1

Time spent on video by 45 vs. class average

