

# K: Kracked Enkoder

Problem author: Leon van der Waal



- **Multi-pass Problem:** Encode an integer  $1 \leq x \leq 2^{30} - 2$  into 29 bits, and decode it back.

# K: Kracked Enkoder

Problem author: Leon van der Waal



- **Multi-pass Problem:** Encode an integer  $1 \leq x \leq 2^{30} - 2$  into 29 bits, and decode it back.
- Normally, you need 30 bits to encode integers up to  $2^{30}$ .

# K: Kracked Enkoder

Problem author: Leon van der Waal



- **Multi-pass Problem:** Encode an integer  $1 \leq x \leq 2^{30} - 2$  into 29 bits, and decode it back.
- Normally, you need 30 bits to encode integers up to  $2^{30}$ .
- **Observation:** We can choose the length of the string we send.

# K: Kracked Enkoder

Problem author: Leon van der Waal



- **Multi-pass Problem:** Encode an integer  $1 \leq x \leq 2^{30} - 2$  into 29 bits, and decode it back.
- Normally, you need 30 bits to encode integers up to  $2^{30}$ .
- **Observation:** We can choose the length of the string we send.
- Therefore, the total number of strings we can send is

$$2 + 4 + 8 + \dots + 2^{29} = 2^{30} - 2.$$

# K: Kracked Enkoder

Problem author: Leon van der Waal



- **Multi-pass Problem:** Encode an integer  $1 \leq x \leq 2^{30} - 2$  into 29 bits, and decode it back.
- Normally, you need 30 bits to encode integers up to  $2^{30}$ .
- **Observation:** We can choose the length of the string we send.
- Therefore, the total number of strings we can send is

$$2 + 4 + 8 + \dots + 2^{29} = 2^{30} - 2.$$

- **Solution:** Send  $n + 1$  in binary, but remove the leading 1. That way you send 1 less character.

# K: Kracked Enkoder

Problem author: Leon van der Waal



- **Multi-pass Problem:** Encode an integer  $1 \leq x \leq 2^{30} - 2$  into 29 bits, and decode it back.
- Normally, you need 30 bits to encode integers up to  $2^{30}$ .
- **Observation:** We can choose the length of the string we send.
- Therefore, the total number of strings we can send is

$$2 + 4 + 8 + \dots + 2^{29} = 2^{30} - 2.$$

- **Solution:** Send  $n + 1$  in binary, but remove the leading 1. That way you send 1 less character.
  - When decoding, add back the leading 1.

# K: Kracked Enkoder

Problem author: Leon van der Waal



- **Multi-pass Problem:** Encode an integer  $1 \leq x \leq 2^{30} - 2$  into 29 bits, and decode it back.
- Normally, you need 30 bits to encode integers up to  $2^{30}$ .
- **Observation:** We can choose the length of the string we send.
- Therefore, the total number of strings we can send is

$$2 + 4 + 8 + \dots + 2^{29} = 2^{30} - 2.$$

- **Solution:** Send  $n + 1$  in binary, but remove the leading 1. That way you send 1 less character.
  - When decoding, add back the leading 1.
- **Solution:** There are many other solutions.

# K: Cracked Encoder

Problem author: Leon van der Waal



- **Multi-pass Problem:** Encode an integer  $1 \leq x \leq 2^{30} - 2$  into 29 bits, and decode it back.
- Normally, you need 30 bits to encode integers up to  $2^{30}$ .
- **Observation:** We can choose the length of the string we send.
- Therefore, the total number of strings we can send is

$$2 + 4 + 8 + \dots + 2^{29} = 2^{30} - 2.$$

- **Solution:** Send  $n + 1$  in binary, but remove the leading 1. That way you send 1 less character.
  - When decoding, add back the leading 1.
- **Solution:** There are many other solutions.

Statistics: 44 submissions, 9 accepted, 26 unknown