# IDL - Appeal, Exam B.

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**Question 7 - RNN nets.** Does a recursive net of type Elman, that gets the zero vector as input at each step, can count? Namely, outputs the value $t$ at its $t$-th step?

1. Yes
2. No
3. In general No, Yet when given $t$ as initial input, yes.

My answer: (3), Correct answer: (1) .

I believe that the confusion arises from the order of entities. The question: 'Is there an Elman cell that can count until $t$ for an arbitrary $t$?' is a different question than: 'Fix $t$, does there exist an Elman cell that can count until $t$?'

For the **second** question: There is a family of unbounded fan-in/out circuits, at width $poly(|t|)$ (the length of the encoding of $t$), that implement addition: [addition in $AC_0$]. It's not hard to see that the implementation in the notes can be realized using an Elman cell, and therefore one can find such a realization that adds 1 to the input which is entered via the hidden channel.

For the **first** question, in which we first fix the Elman cell architecture, and therefore also fix the width of the output. Thus, the number that can be outputted using the cell has to have a suitable length and cannot be arbitrary.

I marked the third option since saying 'on given $t$ as initial input' implies that $t$ is a valid input/token to the cell, namely has a length that matches the cell's weights.

**Question 8 - Inception Score.** Which of the following scenarios is expected to yield high IS score, although the generated images are at low quality?

1. The model generates a blurred images, yet with high number of categorical.
2. The model generates clear elements that are easy to classify, Yet the elements (inside them) are unrealistic.
3. The model generates good images and then add them a random noise.
4. The model generates images with high variance between the outputs at the pixels level, but their sementic content repeats on itself.

**Question 14 - VAEs.** What is the reason for the generated images by VAEs been blurred compared to the images generated by GANs ?

1. Usage of reconstruction loss that smooth sharp items.
2. KL-divergence element that impair the disentangle (or separation) of different samples in the latent space.
3. Low presentation ability of the VAEs architecture.
4. Entering too mach noise into the latent space, which after decoding comes into fact in burred image.