# Lab 3. Task 1- preparation task Template for answers

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*Student names and LiU-IDs: (Max 2 students per group):*

*1.*

*2.*

*Submission date:*

*Version (in case you need to re-submit):*

1. **2D Fourier spectrum**

**1)** Spec1:

**2)** Spec2:

**3)** Are there any differences between and ? How does shift affect the spectrum of the Fourier transform?

**4)** Spec3:

**5)** Are there any differences between and ? How does rotation in the spatial domain affect the Fourier spectrum? (Ignore some distortions caused by the black area around the image after rotation ())

**6)** Spec4:

**7)** Compare and and explain how the elimination of vertical bars affected the spectrum. **HINT:** Look specially at the **horizontal** axes of the spectrum.

**8)** Explain what would happen to the spectrum if the horizontal bars were eliminated from ?

**9)** Spec5:

**10)** Compare and and explain how the elimination of diagonal bars affected the spectrum. **HINT:** Look specially at the diagonal axes of the spectrum.

1. **Period and Frequency**

**11)** Where would these three dominant peaks appear if is transposed, i.e. if the vertical bars become horizontal?

**12)** What is the frequency of these stripes? Where would the three dominant peaks in the spectrum for this image appear?

**13)** What is the frequency of these stripes? Where would the three most dominant peaks in the spectrum for this image appear?

1. **The importance of the spectrum and the phase angle**

**14)** E1\_E2:

**15)** E2\_E1:

**16)** Is the spectrum or the phase angle that has more effect on the structure of an image based on your visual analysis of the above results?

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