Exam 1TD389, 2021-08-19

⚠ Det här är en förhandsvisning av den publicerade versionen av quizet

Startad: 2 dec kl 12.35

Instruktioner för Quiz

In the first question of this exam quiz, you will be asked to upload an image of some ID (photo of your ID card, driver's license, or passport). This is to verify that you were the person who wrote and handed in the exam. Then, you are supposed to pick the correct statements for each of the questions. An example:

If a question has maximum N points and there are x choices that are correct, then each correct answer awards you N/x points, while every wrong answers will reduce by N/x. But you cannot get less than zero per question! In other words, if a question has 6 points and 4 answers are correct then every correct answer you choose will give you 1.5p. If you do not choose a correct answer you will not get the 1.5p for that choice. But if you choose a wrong answer the total credit will be reduced by 1.5p, but you cannot get less than zero.

Please take as much time as you need to answer the questions as well as possible. However, hand-in time will play a factor if you are less than 1 point from a higher grade: if you completed the exam in less than 2.5 hours (half the time), your score will be rounded up, otherwise, it will be rounded down. The motivation for this is that if you took longer time, you probably had to go back more often and look up things in the book and the course material. But do not feel any stress, and submit the exam when you are satisfied with your answers!

Note that the questions cover the general case: there might be some special case we as teachers have not thought about (but clever students would think of). What should you do then? Remember we are not clever students, so answer for the general case!

▶ e limits:
5: 35p   4: 28p   3: 20p

You can always email fredrik.nysjo@it.uu.se during the exam if something is unclear! (I will be available 8:00-10:00, and after 12:00)

Good luck!

Fråga 1	**0 poäng**

Please upload your ID (e.g. student ID, drivers licence or passport)

Ladda upp   Välj en fil

Fråga 2   **2 poäng**

What is true?

- [ ] Visualisations can make use of computer graphics

- [ ] Hans Rosling was a famous Swedish entertainer that visualised data by Marching cubes

- [ ] Underground (metro/subway) system visualisations does not necessarily need to be spatially correct

- [ ] Florence Nightingale made powerful use of data visualisation

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Fråga 3   **4 poäng**

What is true about visualisation?

- [ ] Glyphs are a powerful visualisation technique that helps us grasp up to 100 dimensions

- [ ] Glyph visualisations using many more than 5 dimension can be very hard to grasp

- [ ] Visualisation is more than just pretty pictures, since it can be used as a research tool to get insight into the data

- [ ] Glyphs can be used to visualising data with more than 3 dimensions

- [ ] 3D visualisations are always more effective than 2D visualisations

- [ ] Visualisation usually helps us understand data faster than when looking at numbers

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Fråga 4   **4 poäng**

What is true about data representation?

- [ ] "Topology" is the very same as "Geometry" (they are data representation synonyms)

- [ ] "Topology" describes the dimensions of the object, e.g. angles and edges length

- [ ] "Geometry" describes the form of the object, e.g. is it a triangle, rectangle

- [ ] Interpolation is always a "guess" of what the "missing" data would be like

- [ ] "Topology" describes the form of the object, e.g. is it a triangle, rectangle

- [ ] Unstructured grids take less storage than uniform grids

- [ ] Interpolation usually gives a better representation of the sampled data

- [ ] "Geometry" describes the dimensions of the object, e.g. angles and edges length

Fråga 5
4 poäng

What is true about marching techniques?

- [ ] Marching tetrahedra is aimed for 4 Dimensional data only

- [ ] The ambiguity problem can be solved by looking at adjacent slices and draw conclusions from them

- [ ] Marching cubes handles bifurcations automatically without causing triangle intersections

- [ ] Marching cubes does not suffer from the ambiguity problem

- [ ] The ambiguity problem can not be solved for marching cubes

- [ ] Marching cubes is aimed for 2 Dimensional data

- [ ] Marching Squares produce 2D contours while marching cubes produce surfaces

- [ ] Marching Bands can depict vortices

Fråga 6
4 poäng

What is true about stream visualisations?

☐ Vorticity can be depicted using stream lines

☐ The position of seed points will affect how streamlines will look like

☐ The thickness of stream tubes can depend on some variable in the data

☐ Colour mapping should be avoided as it confuses the visual result

☐ Opacity can be used to make it possible to see the data better (less occlusion), especially for streamline visualisations

☐ One way to get less occlusion is to use fewer lines or tubes (i.e. to use some kind of subsampling of the data)

☐ The position of seed points will not affect how stream tubes will look like

☐ The colour of streamlines can depend on some variable in the data

Fråga 7   **4 poäng**

What is true about high dimensional visualisations?

☐ MipMap is an efficient is a powerful visualisation technique for high dimensional data that projects onto 2D

☐ For very high dimensional data Parallel coordinates are preferred compare to t-SNE

☐ In parallel coordinate visualisations it is preferable to have axis that correlate next to each other

☐ t-SNE will create clusters where similar data (data with similar features) can be found

☐ Parallel Coordinates is useful for visualising multidimensional data

☐ PCA can be used to reduce the dimensionality of high dimensional data

☐ t-SNE is a powerful visualisation technique for high dimensional data that projects onto 2D or 3D

☐ Usually Glyphs makes a better high dimensional visualisation than Parallel Coordinates

Fråga 8   **3 poäng**

Which of the following statements is correct in context of multiplexing of stereo images?

- [ ] Multiplexing using lenticular lenses requires active frame-wise synchronization of the left- and right-subimages

- [ ] Anaglyphs using red/green stereo-glasses are efficient as they preserve spatial image resolution

- [ ] Spatial multiplexing with lenticular lenses lowers the effective images resolution

- [ ] Temporal multiplexing using active shutter glasses leads to lowered brightness & contrast of the displayed images

- [ ] Interlaced-stereo images (with left and right images on alternating pixel lines) can not be used with active shutter glasses

- [ ] Passive polarizing filter glasses cannot be used for temporal multiplexing

Fråga 9   2 poäng

Stereoscopic images, when produced and displayed with computer, can give convincing impression of a 3D scene. However, it should still be consider, that stereography / stereographic images must be used sensible to make the illusion work. Which of the following applies when it comes to producing effective and comfortable to view stereo-images?

- [ ] The accommodation-convergence conflict depends on apparent parallax and viewing distance to the screen

- [ ] The size of the screen determines how close to the user a virtual point in 3D can be represent

- [ ] The resolution of the screen sets limits as to how small a depth difference can be represented in a stereographic visualization

- [ ] The accommodation-convergence conflict (AC conflict) depends on the size of the stereo-display

Fråga 10   3 poäng

Luminance and contrast in visualizations are important aspects of a visualization. Which of the following is true when it comes to human perception of colors/intensities in visualizations?

☐ Simultaneous contrast overemphasizes intensity differences across intensity boundaries

☐ Brightness adaptation enables us to perceive detail and contrast across a wide range of illumination levels

☐ Brightness adaptation enables us to judge absolute levels of intensities across a wide range illumination levels

☐ Simultaneous contrast enables correct assessment of absolute intensity levels in a visualization

☐ Receptor bleaching and chromatic adaptation can cause incorrect interpretation of colors

☐ In 3D visualizations, shadows and shading effects are important to enhance the visual assessment of lightness levels of objects

Fråga 11
2 poäng

For efficient use of color in visualization, **two** among the following aspects must be considered?

☐ In order to label a few (up to 10) items in a visualization with colors, it is important to guarantee that colors are perceptually orderable

☐ In order to reveal qualitative properties in visualizations of some items, the semantics (meaning) and conventions regarding the colors is more important than contrast

☐ In order to express 5-8 different quantitative values in a visualization with colors (e.g. number of cylinders of car-engines in a visualization of a car database), neither perceptual linearity nor ordering of the used colors plays an important role

☐ In order to convey quantitative information in a visualization using color scales, it less important to maintain perceptual linearity, but more important to maintain highest contrast

Fråga 12
3 poäng

What is true about transparency and shadows?

- [ ] Transparency is the only way to show different layers in the data

- [ ] Opacity values for data points are often stored in a texture or obtained from a transfer function

- [ ] Global effects like shadows and ambient occlusion can affect both the visual quality of a visualization and the perception of shape

- [ ] The Painter's algorithm handles intersecting triangles well, since sorting is performed per pixel

- [ ] The Painter's algorithm allows us to efficiently render transparency for complex models with many triangles or layers

Fråga 13

2 poäng

What is true about volume rendering`

- [ ] The opacity function in a transfer function should always be linear

- [ ] Splatting does not lead to data reduction, because no explicit representation of the isosurface is stored

- [ ] Direct volume rendering techniques can be implemented on rasterization-based graphics processing units (GPUs)

- [ ] The ability to interactvely change isovalue is useful when exploring for example a medical CT volume

Fråga 14

3 poäng

What is true about vector field visualisations?

- [ ] Vector glyphs shall never be set to have unit lengths as it leads to cluttering

- [ ] Vector fields can be visualised by computing the so called Curl

- [ ] Vector fields can be visualised using vector glyphs

- ☐ Vector fields cannot be visualised without vector glyphs

- ☐ Vector fields can be visualised by computing the so called Promotor

- ☐ Vector fields can be visualised by computing the so called Divergence

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Lämna in quiz

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