Exemplary Exam Questions for Media Integration

1. What is media integration?

Multimedia integration means bringing together conventional media forms in order to form a novel integrated kind of information.

2. What is the relation between multimedia and media integration?

Multimedia is in this sense is only a subarea of media integration.

3. What do interactive media allow the user?

Interactive media allow the user to individually combine and select the information offered.

4. What is the technological base for media integration and interactive media today?

Today, the technological base for media integration and interactive media is the digital media technology.

5. What are media?

Media are a vehicle that allows to transmit information across space and/or time. (Writing --> picture medium, like drawing or sketch).

6. Which different forms of media can be distinguished?

Auditory media, visual media, technical media (by using technical equipment), electronic media (by using electronic media).

- Individual media (telephone, letter, mail)
- Mass media (TV, radio, journal)
- one-directional media (from sender to receiver)
- two-directional media (from sender to receicer and back)

7. What are symbols? What are they used for? What can be lost when using symbols and why?

Information must always be transmitted to symbols. Symbols represent the information. Symbols are transmitted like characters, voltage changes or bits and bytes. Information can be lost during the transmission. Symbols must be converted back after transmission by technical equipment or human brain.

8. Explain the differences between hypertext, hypermedia and multimedia!

Hypertext: electronic form of text information. User is allowed to jump to another place within the same text by clicking "hotwords" or links.

Hypermedia: not only jumping to another text position, but also to another media form. Presentation is not graphically integrated.

Multimedia: combined presentation of conventional media forms (pictures, graphic, photo...) and futher forms by the aid of computer technilogy but also without.

9. What are conventional media forms? List the ones that you know, please.

- Language
- Drawing
- Writing
- Printing
- Photography
- Audio
- Motion Pictures
- Animation

10. When is media integration better than individual media, when not? Please explain your statement.

- if the limitation of the human perception systems are respected.
- if the creation traditions of the individual media forms are well known and applied in a qualified way.
- if the content to be presented is appropriate for multimedia presentation.

It should be only applied if there is a real benifit comprared to a single medium.

11. Which different approaches and sub-approaches of media integration do you know? Please explain the approaches you know and describe the differences.

Two different approaches exist:

1. **Combination of various single media:** (content related aspect)
   - Graphics, Text, Audio, Data records, Speech, Animation, Video, Photo

2. Cross platform presentation of information: (channel related aspect)

2a.) Media content can be distributed to the user by different channels, e.g. TV, Radio, Telephone.

2b.) two non-uniforms attempts:

2b1.) redundant: at first content is distributed by one channel, after that the content is splitted up to several channels

2b2.) complementary: each media content is distributed by its own channel. (content1 via channel1, content2 via channel2,...)

12. Which distinct media platforms do you know? How can these also been seen as? What exists apart from them? In how far do the different media platforms mentioned differ from each other?

a.) book, newspaper, magazine, radio, record, audio CD, film, TV, video, CD-ROM, DVD, Internet
b.) can be seen as channels for the distribution of content
c.) It also exists individual media (telephone, letter, mail)
d.)
- human perception channels
- traditions of the preperation and structuring of the content
- reception habits
- aquisition and production of the content
- transmission of the content (data rates, resolution)
- utilization of the content by end user

13. Which typical operation steps does the production of projects of media integration normally include? Please list all steps you know and explain each single step briefly.

1. Conception: Research and specification of the content, graphic design, layout...
2. Creation of the assets: Creation and editing of the multimedia elements
3. Integration: Combination and organization of the multimedia elements
4. Programing: Creation of interactivity and special functions by coding
5. Testing, Debugging and Corrections: Evaluations and error location
6. Finalization for the distribution: Technological preparation for the publication
7. Distribution: Publication and dispersion

8. Service and Support: Maintenance, servicing and futher development, hotline

14. In how far are interactive multimedia productions are challenge for media producers and content creators? Which two different production forms come together in this case?

a.) qualified combination of single media requires experience with every single medium and profound know-how about their beneficial combination.

b.) software production and media production

15. Media integration is normally accomplished as teamwork? Which members does such a team typically have and which typical qualifications of the single team member have?

- Screen designer
- Writer and editor / researcher
- Programmer / integrator
- Audio video professional
- project leader with experience in all sectors

16. Please list the typical 15 phases of a project of media integration and explain every phase briefly.

1. Briefing: initial talks between customer and producer. General conditions, general framework, objectives, costs are discussed and defined. Rough schedule is set.

2. Exposé: proposal for the project, rough draft, no details, without fee

3. Treatment: covers all significant aspects of the project, first conceptional efforts, still too rough, a basis for the production, without fee, protect copy rights

4. Demo, Prototype: prototype of the application shows substantial features, commissioned work, with fee

5. Contract for production of the screebook: between customer and producer, production of a detailed screenbook, legally essential

6. Conception: Brainstorming, recherché, prerequisites, features, functions, graphic conception, screen design, layout, media elements and their combination, availability of existing material, third party material, navigation and user guidance, flow chart, technical specifications of the user platform, production

environment, time schedule with milestones, defining a project team, defining exact ranges of task, determination of man days, machine hours and cost schedule

7. Screenbook: containing all descriptions and information needed for the production, commissioned work
Result: description of every screens, sketch and functions

8. Contract for the production: Object of the contract is the content of the screenbook

9. Production: it is based on the screenbook

9.1 Production of the multimedia elements: digitization, creation and editing of the assets

9.2 Integration: Combination of assets and common positioning of visual assets

9.3 Programming (Coding): Implementation of interactive functions, aid of programming language or through visual programming

10. Testing, Debugging and corrections: tested for errors by unbiased testers, wether the product matches the screenbook, final status of the product

11. Specification test and acceptance by customer: detailed test of the product by competent persons, customer signs acceptance certificate, final rate of payment

12. Preparation for the distribution: duplication of the product according to the amount are needed, carried out by special service providers

13. Distribution: specialized reseller, product reaches the end-user

14. Service and Maintenance: contractual agreement about servicing and maintenance (Customer <-> Producer)

15. Support: contractual agreement about support (Customer <-> Producer)

17. Please list up to 11 categories of interactive multimedia applications and explain each listed category briefly.

1. POI: in a self-explantory form, information of the publice (offline + online)

2. POS: selling good and services, in public buildings

3. Kiosk Systems: mostly like POI and POS, in public buildings and fairs, closed terminals with touch screen

4. CBT/CAL: computer based training, computer aided learning

5. WBT: web based training

6. Catalogues, Dictionaries, Encyclopedias: information is available fast; searchable, present and visualize in a multimedia way

7. Edutainment: Education and Entertainment

8. Games: pure entertainment, private sector, fast multimedia PCs

9. Online Publishing: fast access to information and know-how

10. E-Commerce: selling goods and services electronically

11. M-Commerce: Selling goods and services to mobile customers

18. What does the term POI stand for? Which objective is followed with that? Where is POI used? What technology can be used to realize POI?

a.) POI = Point Of Information
b.) Transfering inforamtion in a self-explanatory way form
c.) Information of the public (online + offline)
d.) PC, Mac, DVD-Player, kiosk systems, hard disk, CD-ROM, DVD, server, updating by online connection

19. What is kiosk system?

Mostly like POI and POS, used on trade fairs, public buildings, airports, office buildings, banks..., closed terminals with touch screen (PC, Mac, DVD Player)

20. What is WBT and what is it used for? Where is WBT being applied? What technology can used to realize WBT?

a.) WBT = Web based training, used for triggering, aiding and guiding learning processes
b.) in schools, universities, private educational facilities, self-distance education
c.) Multimedia PCs with access to internet/intranet, Mac, Unix, Linux

21. What does the term 'Edutainment' mean? What technology can be used to realize Edutainment?

Education & Entertainment = information/knowledge acquisition + multimedia entertainment. Multimedia PC / DVD Player. Data distribution by CD-ROM/ DVD/ server on network

22. What is the classic question of the communication theory? Please write down the complete question and explain every section of it.

'**Who** says **what** to **whom**, on **which channel**, for **which purpose**, with **which effect**?'

Who : Initiator, Sender. Customer, institution, enterprise: definition necessary!
What: Message, info. Content, statement. Definition necessary! Often unclear.
Whom: Target group, receiver. Exact definition necessayry, top or flop.
Which channel: medium, technology. Has the proper channel for the communication objective been chosen at all?
Which effect: Evaluation, impact. Interviews with target group. Effect reached?

23. What does the psychological resource model state? Which consequensces can a disregard of this model have? How should one proceed therefore, when doing media integration?

The human's ability for perception of information is limited. Attention is spread over the human sences. Oversupply can lead to dispersion of attention -> negative effects on the perception. The more intensely, the less coordinated
and syncronized on each other
Better: optimal coordination and syncronisation of the information items.

24. Please explain the differences between recherché, brainstorming and editorial work in connection with the conception of projects of media integration.

Recherché: helps to **get familiar** with the **general framework** and the **key features** of **the project**. Helps to better **understand** the **topic** or **matter** of the project.

Brainstorming: possibility for creating ideas for the conception. All ideas are gathered first, even the nonsense. Later the ideas are debated, sorted, etc.

Editorial Work: The actual work at the contents. E.g. Selection of pictures, writing text for the screen & speaker, the contents-related structuring and medium-adequate preparation of materials, etc.

25. What is the task of screen design? What does it include? What should alsways be regarded?

Defines the overall aspect of all screens. It includes the selection, design and positioning of navigation elements, text fieldes, pictures and all other visual assets. The taste and the preferences of the target group should always be regarded.

26. What is visual attractiveness of a screen design? What effect can it have (positive, negative)?

Visual attractiveness is the first emotional effect of a design on the viewer. It can increase the users attention & motivation if it is positive and vice versa.
The lacking of visual attractiveness and the missing individuality can arise boredom.

27. What visual elements of screen design do you know? Please list up to 9 elements. What does an experienced screen designer use this elements for? What can he influence with them?

Content, Information, Navigation, Interaction, Orientation, Decoration, Organization / Dividing, Motivation, Attention guiding elements (eye catcher)
He knows how to use these elements in order to achieve a design of high visual attractiveness that meets the needs of the target group. He influences perception and information processing on the side of the user.

28. What dou you know about perception of screen content? Please list some aspects mentioned in the script and draw your conclusion out of each aspect listed.

There is a direction of reading (wester <-> eastern). There is a diagonal axis of highest attention (western: upper left to lower right corner). Zones of low and high attention. Elements not in this zone ➔ not recognized or recognized worse. Moving/changing objects ➔higher attention. Can be used to guide attention! Laws of gestat psychology: Law of closeness ➔ objects belong together. Law of coverage ➔ two objects, one behind the other if one coveres a part of the other.

29. How can virtual 3D be reached on a screen? Explain some techniques. Why is no true 3D possible? What is 3D typically used for in screen design.

Virtual 3D can be reached with: covering objects, shadow, highlight, sharpness/unsharpness, perspective, similar objects of different size ➔ spatial depth, covering layers with fading colors ➔ spatial depth. True 3D not possible because the sreen delivers the identical picture to both eyes. 3D typically used to create depth.

30. What three central demands should the screen layout fulfill? List all three and explain each.

1. The UI should be easily understandable without explanation.
2. The user guidance should be logically in a way that allows for easy understanding and easy remembering of the content-structure in terms of topics and subtopics.
3. The control area should be separated from the information area.

31. What can colors be used for in screen design? What has to be regarded using colors?

Colors have an emotional effect. Colors can be used as signs and symbols.
Colors have meanings. Graphical weight can be assigned to objects by the use of colors. Contrast between colors is important, respect the different meanings in different cultures.

32. What do you know about contrast and screen design? What forms of contrast do you know? Why is it so important to have enough contrast and how can low contrast be improved?

A computer screen is an active source of light. It can over stimulate the retina of the human eye -> eyes get tired! Good screen design should avoid this.

Elements in the background and in the foreground should clearly differ from each other in terms of **brightness, contrast and color**, in order to **guide the viewer's attention** toward objects in the foreground. The background should therefore provide **optical support** for the elements in the foreground and allow for a **structuring** of these elements.

Achromatic contrast: between different shades of grey, human eye can differ between 200 shades of grey. **Grays and colors of the same brightness do not seem equally bright**. The **colors tend to seem subjectively darker than the grays**.

Color contrast: This is the **contrast between different colors**. It is interesting that **primary colors** have a **higher color contrast** to each other **than secondary colors**. On a **dark background** colors seem to be **stronger** and more **colorful** than on a bright one. **But**: the darker the screen, the more reflections. -> against ergonomic objections
Color contrast is strongest between **Yellow** and **Violet**. Here there is a **contrast of about 3:1**.
In is interesting **that certain colors seem to be visually closer to us** than other ones. For example warm colors on a black background seem to be closer than cold colors. This effect can be used to create virtual three-dimensionality on a screen.

1. **Text** on the screen should have **sufficient contrast to the background** in order to guarantee readability under different ambient light conditions.
2. To test if there is a **sufficient difference** between the objects on the screen in terms of **achromatic contrast** and **color contrast**, **printing out in grayscale** is a good help

33. Which 5 questions of orientation does a user want to be able to answer himself at any time? How can the screen designer help the user in his desire to be able to orient himself?

The user should be able to answer himself the following questions at anytime and at any position within the information system:

- **Where did I come from ?**
- **Where am I at this moment ?**
- **Where can I go to from here ?**
- **What is expecting me there ?**
- **How relevant is this for me ?**

The screen designer can help the user by offering special **orientation elements** by drawing on the findings of the **research on human perception** (psychology, cognition, communication,

art...) and relying on **conventions**, **analogies** and **metapho**rs. The screen designer should support the users orientation by **positioning elements** that have already been introduced **always at the same location** and **keep their function** as well. This feature is known by the term **consistency**. Beyond his need for orientation within one single screen, the user normally also has the **need to orient himself within the complete system of information** offered. In this attempt he wants to be able to achieve an **overview** and understand, what **percentage of the total information** he has **already seen** and **how much is** still missing. For this purpose a **sitemap** or a **display of percentage** are valuable for the user, for example.

34. Explain the differences between global and local structure of information. Which kind of structure comes close to the way humans organize and represent their knowledge in the brain? What two parameters should always be balanced well, when structuring information?

The **global structure** defines, how the information is spread across the different screens of an information system. The **local structure** on the other hand clarifies, how the content is organized on a single specific screen.

The introduction of **content categories** and **hierarchies** (e.g. headlines, sub-headlines, etc.) comes very close to the way humans organize and represent their knowledge in the brain and therefore is easily understood by most users.

There should always be a **good balance between depth and wideness of information**. Too many hierarchical layers require too many clicks on the side of the user in order to access the desired information for example. On the other hand, if there is **too much information** offered **on one single screen**, the **amount of information** gets **too big for lossless reception** and **remembrance** of this information. Or the user has to scroll very often in order to access information, which many users regard as annoying.

35. Explain the 'rule of the 7 information items'. What meaning does it have for screen design?

Cognition psychology has found out that humans can always perceive and process an average of **7 information items at one time only**. Then we need a little break in order to move these 7 items from the ultra short-term memory via the short term memory to the long term memory, where the information is finally stored.

36. Which different possibilities of user guidance do you know in navigation? List the different principles mentioned in the script and explain the differences. Draw sketches to underline your explanations.

Guided navigation structure
Open navigation structure
Flat menu structure
Deep menu structure

Beginners and users with little prior knowledge of the topic tend to **prefer guided navigation structures**. To the contrary **advanced users** mostly **prefer open navigation structures.** The content can be offered in form of a **flat** or a **deep menu structure**, which means one has to decide between **menu depth** and **menu wideness**.

37. Please describe the correlation between interactivity on the one hand and the layout of the user interface on the other hand. What consequences does this correlation have for screen design?

The higher the amount of **the interactivity** offered, **the less space** on the screen remains **for the contents or information** itself. In most cases interactivity requires **navigation elements** that **have a minimum size** (especially on touch-screens). Navigation elements should show a **high amount of consistency** regarding their **spatial positioning** and their **function.** Otherwise **confusion can arise fast**.

38. What are metaphors and what are they used for in screen design? Please quote some typical examples of metaphors in screen design. What should be regarded, when using metaphors?

Orientation - Analogies and **metaphors** normally work on the basis of the **users prior knowledge** or **prior experiences**. From this stored knowledge he draws information that can help him in the actual situation, for example to orient himself. If the **user does not have** the **corresponding knowledge** or **experience** necessary, (in order to understand the analogy or metaphor applied by the screen designer) then **the desired effect is not reached** and the user ends up confused.

Typical **orientation helpers** can be derived from **analogies** or **metaphors**, like a **growing bar** or a **little watch**, in order to inform the user about the **length of waiting periods** or loading times for example.

Typical navigation elements are **buttons** or **hyperlinks**. Buttons can also be realized as **icons** and/or use **metaphors**.

Icons or ***visual metaphors*** should not interfere with the users prior knowledge and represent their function unambiguously.

The application of **metaphors can help to ease the comprehension of interactive functionality** as well as the structure of the contents and the contents itself. Metaphors should be used in a consistent way in order not to confuse the user.
A **sign language** (metaphors, icons, etc.) also has a **grammar**, like a real language, called **semiotics**
What is no button, is not supposed to look like one...!
Typical metaphors are for example the use of tape-recorder buttons for navigation (overused already...) or the trash for the erasure of files (Mac OS, Windows).
The **additional benefit** for comprehension or orientation should be **well balanced against a possible confusion** on the side of the user, when applying metaphors
Different cultural backgrounds in the field of the users can **influence the comprehensibility of metaphors**

39. What do you know about user profiles? List some typical user profiles and explain the differences. How should navigation and information structure react to the existence of different user profiles?

Beginners and **first time users** as well as **novices** to the topic often **prefer a very predetermined form of navigation**, following a clearly guided structure. They exchange the possible freedom of navigation for guidance, in order to not get lost.
Second time users (generally all users that come back again) tend to perform a **selective search of information** and therefore desire a more **free form of navigation** that allows them to **directly access certain information**.
The same applies to **experts of the topic** (even when being first time users).
These users want a **very fast and direct access to certain parts of the information** and regard a guided form of navigation as annoying and limiting. They normally also **desire more depth of the information**, than beginners.
Depending on the content and the target group, there can be **other additional user profiles** that should be researched and considered during conception.
Today interactive media tend away from a static towards a **dynamic approach to the question of user profiles**. In near future dynamic interactive media could learn from the users behavior and

adapt to the users needs in a way that allows the offer of information in the most appropriate way for the user or user group in question. **Intelligent interactive systems** might be able to research their own user profiles and present the content in the appropriate way even without the media designer having to manually change the content, every time a new user profile is detected.

40. In which different forms do still images appear in multimedia products? What function can images have? What do you know about the combination of images and text? What emotional effect can images have on the members of the target group?

Images mostly appear in the form of **drawings**, **illustrations** or **photographs**.
One function of images (pictures) is the **visualization of information** that cannot be described well in text form. 'An image says more than thousand words' says a German proverb. But this is only true, if it is **the right image at the right place**.
An **adequate combination of images and text** can **improve knowledge acquisition** and **remembrance** on the side of the user. Images and text can complement one another, when presented together, like described by Paivio (1971).
Images often have a **strong emotional effect** like colors. The use of the adequate images can have a **attention arising and motivating effect** on the members of the target group chosen. In this case **images transport emotions** (so called emoticons) rather than information (like in the case of visualization, see above).

42. What is a screenbook? What definitions should it contain for every screen? What additional specifications are important?

The final result of all conception efforts is a screenbok . It is the complete knitting pattern for the production and constitutes the basis. It constitutes an essential legal basis for the two contracting parties (producer and customer).

The screenbook contains for every screen a sketch , screen text or speakers texts, description of voice, music, animations, videos, indications regarding picture to sound sync., transition to the next screen, definitions of the links and navigation, imformation about additional interactive functions.

Additionally, the definition of fonts, the colors and styles , naming filenames , time schedule for the production , complete flowchart of the navigation , definitions regarding CI (Corporate Identity) are of important specifications.

43. What is flow chart and what is it used for?

The flow chart is an important guideline for both the designer and programmer. It is a graphical representation of the sequence and the navigation and interaction structure.

44. What are multimedia assets? Please list 5 typical multimedia assets.

All kinds of digital files that become parts of multimedia applications are multimedia assets. Images, Text, Audio, Video, Animations are 5 typical multimedia assets.

45. By which process are multimedia assets typically created? From what source ? Which two technical parameters play an important role in this process? Which correlation exists between quality and amount of data at this process ?

When analog sources are been digitized, then multimedia assets are created. Two technical parameters that play an important role are sampling rate and bit depth. The less the quantization, the higher the quality. But high quality mostly also leads to high amounts of data. An adequate compromise between quality and storage space required or data rate must be found.

46. What does the quality of the result of a data acquisition or digitization mainly depend on ?

It depends on two factors:The quality of the original anaolog source and the technical performance of the digitization system.

47. Which different descriptions for resolution do you know ? Does it always make sense to utilize the maximum resolution of the data acquisition system ?

Resolution can be expressed in sampling rate, bit depth, highest spatial resolution, highest spatial frequency, maximum data rate, bandwith.
It does not make sense because it will lead in high amount of data captured in comparison with the needed requirements.

48. What happens technically, when the resolution is reduced or enhanced after data acquisition? Is this to be recommended?

If reduction is carried out by interpolation, additional loss in quality will be caused by introducing additional noise or unsharpness. This is not recommended in bitmap graphics.

49. What is compression in connection with digital media? Why does compression become necessary ?

It means the reduction of data amounts without the loss of the original information. After data has been compressed, it will be stored in compressed form to save storage capacity.

50. Which two different techniques can be distinguished in connection with compression?

Loss free compression and lossy compression are two techniques.

51. Explain the difference between redundant and irrelevant data in connection with compression?

Loss free will remove only redundant information and lossy compression will also removed relevant information so then will decrease the quality of the image.

52. Which objective has to loss-free compression and how is this accomplished? Please list two characteristic fields of application for loss-free compression?

Removing redundant information from the data and in this way reducing the amount of data to the pure relevant information without any redundancy. Loss- free compression is used for media content when very high quality is needed. A typical field for loss-free compression is for software compression. Zip, arj,…

53. Which characteristic compression ratio is typically reached by loss-free compression ?

it reaches typically compression ratios of approximately 3:1 average.

54. What is tolerated in the case of lossy compression in order to achieve higher compression ratios? How does that affect the quality?

A certain loss of information is tolerated on purpose in order to achieve higher compression ratios. A perfect restoration of the original state is not possible. A decrease of quality of the original is therefore unavoidable.

55. How is lossy compression carried out? Please explain the process. What is the high art of lossy compression?

It is not only carried out by removing redundant information but also relevant information from the data. The high art of lossy compression is, to remove only the very part of the relevant data, that is relatively irrelevant for the human perception.

56. Which typical compression ratios can be reached by lossy compression and which influence on the quality can a too high compression ratio have?

Lossy compression typically can reach compression ratios of approximately 150:1 average and more. Below a certain ratio however, the quality diminishes rapidly.

57. When is lossy compression being used in the field of the media production?

In the field of digital media production lossy compression is often used for media content when reasonable quality is needed, but the amounts of data are to be reduced drastically.

58. Please list some conventional formats in connection with lossy compression.

GIF, JPEG, MPEG 1.2.3.4, MP3, ASF, REAL-AUDIO, REAL-VIDEO, FlASH

59. Which two generally different forms of image assets do you know? Please describe the basic differences between these two forms and their concrete influences on data amount and quality. Please list typical fields of application for each of the both forms of image assets.

Two different formats: pixel graphics and vector graphics. In the case of pixel graphics a separate value of up to 32 bits is being stored for each pixel displayed on the screen. In the case of vector graphics mathematical equations and formula are being stored that describe the objects displayed on the screen.

60. Which technical parameters affect the storage space required for pixel graphics?

Dimension of image (pixel x pixel)
Resolution (dpi)
Color depth (bit per pixel)

61. What storage space (in kByte) is required for a pixel graphic of 1024 x 768 pixel with 24 bit color depth? same for 8 bit color depth?

24 bit: 1024*768*24/8/1024=2304 kByte
8 bit:768 kByte

62. Please list some typical screen sizes for multimedia-applications.

640 x 480 pixels ➔ former standard (outdated)
720 x 576 pixels ➔ DVD Video (Europe)
800 x 600 pixels ➔ CD-ROM, DVD-ROM, WWW
1024 x 768 pixels ➔ CD-ROM, DVD-ROM, WWW

63. Please list some graphic file-formats for multimedia applications. Which are typical for which platform?

CD-ROM ➔ BMP (Win), PICT (Mac), JPEG
DVD ➔ PSD (Photoshop)
WWW ➔ GIF, JPEG

64. What are the major advantages of vector graphics in comparison with pixel graphics? Please explain each advantage. What disadvantage do you know?

- vector images (based on mathematical equation and formula) require much less storage capacity than pixel images (vector images don't storage every single pixel).
  vector images can be scaled and resized independent of resolution and quality
- Natural images can not be displayed well with vector images. Vector images are not acquired using Scanner or Cameras➔ created by Software on a PC

65. Which two technically different forms of text presentation on screen do you know? Please explain both technical principles. Advantages and disadvantages? Fields of application?

- ASCII text and Bitmap text
- ASCII: for every character a special vector graphic is stored in the type font.
  Bitmap: text is stored as a pixel image
- Bitmap has a larger amount of data as ASCII.
  ASCII can look coarse and ugly because of the small resolution of 72 dpi, especially in big size and italic (help ➔ antialiasing, but causes unsharpness). Problems if the (ASCII) font type is not installed on the local PC.

- for good looking text use Bitmap-text; for faster display on screen use ASCII (i.e. used in WWW)

66. Explain the differences between ASCII und Bitmap texts. Which different of use do you know for both forms?

see above

67. How is Bitmap-text being created and from what? Please explain the process shortly?

It must be stored as a pixel image to benefit from antialiasing (GIF, JPEG) or store it with Macromedia Flash.

68. Which typical functions can sounds have in projects or media integrations?

The field of applications are music, sound effects or speaker's voice.

69. Which technical parameters can be seen as a good compromise for uncompressed sound? For speaker's voice? For music?

- 22 kHz, 16 bit, mono (for sound, speaker's voice) or stereo (for music)

70. Please list some current compression formats for audio for application in online- and offline-projects of media integration.

MP3, WMA, Real Audio, Dolby Digital, ShockWaveAudio, Qualcom Q-design

71. Which general problem with images and sound often exist exists in the case of multimedia applications and why? How can be this problem be solved?

No Synchronicity, because of loading etc (mostly separated files of sound and image).
Problem can be solved with "interleaving" (interlaced (alternating) storage of image and sound in one file)

72. What is streaming in connection with multimedia over networks? Why is streaming necessary? How does it work?

For transmission of audio data over the internet streaming is used: the file will be stored in a local buffer memory with a variable data rate (from the Internet). From the buffer it can be read with a constant data rate.

73. For which different purpose can digital video be used in multimedia productions? Please explain each purpose shortly.

Digital video is used in multimedia productions for three different purposes typically:

- Presentation of ***moving images*** which were captured with a camera
- Presentation of ***animations*** that can not be reproduced by the playback system in real time, due to performance problems (2D- and 3D computer animation)
- Presentation of ***virtual reality*** (based on Quicktime VR for example)

74. Video can not be used in multimedia-projects without compression. Why ?

In order to be able to use ***digital video*** in multimedia productions at all, it ***must be compressed heavily***. Without compression the amount of data can not be handled by current multimedia playback systems (like Multimedia PCs, etc...).

75. Which two steps does the video digitization typically have ? Please explain each step shortly. How is the audio part of video treated in this process ?

The ***digitization*** of analog video is typically carried out in ***two steps***:
Digitalization of the analog video scenes with the aid of ***special hardware***, compression using a ***M-JPEG codec*** and storage in the ***M-JPEG format***.
Fast computer, fast hard disk and special video digitizer board, equipped with DSP chip supporting M-JPEG, required. **Process done in real time**.
2) ***Recompressing*** the M-JPEG files into final (***hardware independent***) format ***using another codec*** (like Cinepak, Indeo, Sorensen, MPEG 1, MPEG 2, MPEG 4 [DivX], Real Video, Windows Media Video, QuickTime...). Images and sound are being ***interleaved*** at this step.
Process mostly **not done in real time**. Can take very long. Special accelerator hardware can speed up this process considerably (real time possible)
Audio is normally ***digitized at step one*** (without compression) along with the video scenes. It can also be digitized separately and later be combined with the video before the second step. Compression of audio is also possible.

76. What should be regarded, when acquiring video for multimedia use ? Please explain the differences to acquiring video for TV or film.

Video for multimedia must be acquired differently, than for TV or film:
+ **lower contrasts**
+ **less fine details** (for example close-ups instead of totals)
+ **Avoid camera motion** (**pan shots**, **zooms** and **runs**)
+ **Short shots** rather than long shots

Further tips:
+ **Videos for CD-ROM** should have a **data rate of max. 350 KByte/s**. Higher rates provoke frequent interruptions of video and audio on slow systems
+ **Realistic dimensions of image area** for playback from **CD-ROM** is **320x240** or **384 x 288**, for **WWW** approx. **120 x 90** or **160 x 120**, only for **DVD 768 x 576** (PAL) or **720 x 475** (NTSC) is applicable
+ The **aspect ratio** should **always** be **integer** (4:3, 2:1, 5:4, ...), since most codecs are optimized for this (else performance loss at playback).

77. Which problem frequently arises during the presentation of complex computer generated animation in real time ? How can a satisfactory presentation be achieved anyway ?

Computer animations can often not be generated well at runtime, due to lack of performance of the playback system and/or complexity. Therefore they are often ***rendered as a sequence of numbered images*** that later is ***loaded as fast as possible*** for presentation. Even this can be very demanding for a standard PC. For this reason the presentation of animation by multimedia systems is often based on ***compressed***, ***digital video files,*** regarding:
Reduce dimensions of area where animation occurs **to the max.**
Don't animate big objects
Reduce color depth of animated objects (for example 8 bit or less)
Optimize loading operations through **preload**
Store data optimized on the surface of the data medium (e.g. **CD-ROM**)

78. Please explain the difference between computer animation and computer simulation.

79. How can a fast search in a data base on CD-ROM be achieved ? Please explain the problem and a possible solution.

In the case of offline media, the data base file is normally stored on a ***CD-ROM*** or ***DVD-ROM*** which is introduced to the internal disk drive of the user's local system. CD-ROM and DVD disk drives typically for technical reasons (CLV principle) have a ***comparably high access time***, compared to hard drives. This fact dramatically ***slows down search processes*** in data bases, stored on CD-ROM or DVD-ROM.
In order to speed up search processes in the case of offline media, it is strongly recommended to ***use indices and store them to the local hard disk*** during installation or hold them in the working memory (RAM). By doing so, the quantity of the accesses to the CD-ROM or DVD-ROM is reduced considerably and the ***search speed is improved significantly.***

80. How does a data base connection for online-media principally work ? Which server-sided software solutions for this purpose do you know ?

In the case of online media, the data base file is normally stored on a ***hard disk*** of a server. ***Access time*** is ***not a problem*** here in most cases, nevertheless the search time is even improved by index-files created before. For short response times on search inquiries a ***high performance server solution*** should be chosen for the data base system
CGI and ***PERL*** support for most data bases
PHP4 and ***MySQL*** e.g. on Apache server for Linux (LAMP system) and Unix, MacOS X server or MS Windows NT/2000 server

81. What is 'integration of multimedia assets' ? What happens exactly ?

In connection with the production of interactive multimedia projects, ***integration*** means the ***junction*** of already generated separate multimedia assets, in order to form an ***integrated presentation***. This implies a ***common organization*** and/or ***positioning*** of the assets on the screen in accordance with the definitions of the ***screenbook*** in most cases.

82. Please explain the line of proceeding during the integration of multimedia assets for offline media. What tool is typically used for this purpose ? Which definitions are specified during integration ?

83. What is an authoring system and what is it used for ?

An authoring system is a software tool that ***allows*** and ***facilitates*** the ***combination*** of different digital media assets to form a ***multimedia presentation*** or ***application***.
The integration of multimedia assets occurs for these platforms mostly with the aid of an ***authoring system***.

84. Please explain the line of proceeding during the integration for online media. What tool is typically used for this purpose today ?

With the aid of a ***HTML WYSIWYG editor***

85. What happens to multimedia assets (like sound or video...) during the integration for online media ? How can they be made accessible for the end user ? What is often required in this case ?

Multimedia contents like video and sound for example ***can not be integrated directly*** in this way. They typically ***depend on*** special web browser ***plug ins*** to be installed on the client side for presentation. The single multimedia ***assets must be prepared*** for this purpose ***in a special way***. In most cases they must be processed and ***encoded with special tools***.

86. What is achieved by programming in the context of media integration ? Please explain the differences between offline media and online media in terms of programming shortly.

The implementation of the ***interactive functions*** like ***navigation***, ***interaction***, ***simulation***, etc ... in accordance with the definitions of the screenbook and/or flow chart is typically done by ***programming*** (coding). The programming also differs between offline and online-media: