Hypertext

XML – Data
XSL - Presentaion
XLink - Linking

- XML
  - Element
  - Attribute
  - Entity (uses in DTD's)
    - <!ENTITY lecturer "Dr. L. Carr">
    - <!—This is a comment -- >

- DTD
  - Pros
    - Good at describing documents
    - Cant manage complex data structures
    - Syntax is not extensible
  - Entitys
    - ? optional
    - + required and repeatable
    - * optional and repeatable
    - EMPTY no content
    - ANY any content
  - Attribute
    - Type
      - Public
      - Private
      - CDATA
      - ID
      - System (proceed with filename)
    - Default value
      - #IMPLIED
      - #REQUIRED
      - #FIXED
  - Namespace
- XML Schema (Same as DTD, better syntax as it's the same as XML)
  - Pros
    - Builds on primitive types
      - Int float string date etc
    - Distiction between types and elements
  - Cons
    - Legal implications of schemas as contracts
    - Syntactic operability with semantic fault
      - Due to DTD and schemas mixing
    - W3C XML Schemas, Too big too complex
    - Too much too soon, developers unsure whats needed
    -
  - Specify the structure of an XML document

    - Constraints on its content
    - Standards
        - XML Schema (Current W3C Standard)
            - Large full featured, unimplemented
        - XML-Data
            - Early contender, supported by Microsoft
            - Reduced set of XML-Data is part of IE5
        - DCD
            - Joint Microsoft IBM
            - Simpler version of XML-Data
        - SOX
            - XML Structures via OO inheritance
        - Schematron
            - Uses XSLT for schemas
        - DSD
            - Simpler schematron
        - RELAX
            - Based on hedge automata theory
            - Much simpler than XML Schema
    - Benefits over DTD's
        - Can constrain the #PCDATA
        - Can constrain repetition
            - Eg 3 children type 2 on this node
        - A precise selection of elements
            - in any combination or permutation

    - S
    -
- DOM (Document Object Model)
    - Is a method to access XML
    - Views the XML as a tree of nodes
    - Javascript has support for DOM
    - Pros
        - Powerful and flexible
        - Good for complex / rich data and documents
    - Cons
        - Must write a program
        - Tedious to specify correct DOM location
    - Nodes have
        - getNodeType
        - getNodeName
        - getNodeValue
    - Element Nodes have
        - getParentNode()
        - getFirstChild()
        - getLastChild()
        - getChildNodes() -> returns a nodelist
        - getNextSibling
        - getPreviousSibling

        - NamesNodeMap
        - getAttributes
    - NodeLists
        - getLength
        - getitem(n)
    - NamesNodeMaps
        - getLength
        - item(n)
        - getNamedItem(str)
- XPath (with DOM)
    - Regular expression for XML
    - Pros
        - Simple, expressive
        - Good for data and documents
    - Cons
        - Cant do anything with it, must be used with DOM or XSLT
    - Navigates around the elements in an XML document
    - Like a URL around the web
    - Can be used in conjunction with other standards of linking
    - /book/chapter/title - Direct path
    - /book/*/title - a title element 1 down
    - /book//title - a title element anywhere
    - ./book/title - relative location
    - ../book/title - up one level
    - title | heading | label - any of them
    - /book/title/@number - the attribute number on the title
    - chapter[title] - a chapter with a title
    - chapter[title="Hello"] - a chapter with a specific title
    - chapter[1] - the first chapter
    - chapter[@number="2"] – chapter with attribute number 2
    -
- One Approach
    - XML - Data
    - CSS - Presentation
    - XForm - User Interface
    - XLink - Behaviour
    - Most of these are under developed so we used HTML as a presentation layer
- XSL - XSLT
    - An XML vocabulary for specifying formatting
    - Ability to transform XML data
    - Formatted Object DTD
    - XSL describes how to transform one XML document into another
    - Stylesheet is a random mix of
        - XSL elements
        - Formatting

    - Namespaces
    - <template match="/">
    - <xsl:value-of select="Xpath expression"/>

    - <xsl:for-each select-“XPath expression”>
- XLink
    - Pros
    - Cons
        - Not yet implemented widely
        - Needs to be tied in with XML processing model
        - Link in with XSL to provide info about link anchors etc
    - ID Based addressing
    - XPath addressing
    - Stepwise addressing
    - Links
        - Locators - identifs the resource
        - Arcs - specifys the connections between the resources
        - Title - description for human
        - Role - description for computer
        - Behaviour
            - Actuate (triggered)
                - User (by a click)
                - Auto (by the app)
            - Show (displayed)
                - New (another window)
                - Replace (current window)
                - Embed (instead of current)
    - Generic Links
        - Keywords
        - Citations
        - Smart tags
    - Linkbase
        - Collection of links
        - Can be swapped allowing different links on same resource
    - XPointer
        - URL#xmas
        - URL#xpointer
        - URL#/1/2/3
        - Ranges
            - #xpointer(string-range(/1/6/4,'Leslie Carr'))
            - #xpointer(id(“sec2.1”)range-to id(“sec2.4”))
- Resource based Authoring
    - Linkbases + generic links are flexible
    - Set of resources and several sets of links for different purposes
    - Content and links separate
    - Eg, simple links for first years, in depth links for phds
- DLS (Distributes Linking Service)
    - Developed by IAM befor XLink came about
    - DLS vs XLink
        - DLS knows about citations, people, formatting and behaviour
        - XLink has no knowledge of contents or presentation semantics
    - Separate linking service
    - Merged with documents on the fly
    - Two linking forms

        - Explicit (positional)
        - Implicit (content based)
- RDF
    - Add Meta-Data to data
        - Who wrote it
        - Who owns it
        - Who authorised it
        - When is it valid
        - What rights are ascribed to it
        - Documents
            - Title / Author / Journal /Date /Keywords
        - People
            - Role / History / Salary /Expertise
        - Exhibits
            - Catalogue Number / Price /Date /Artist
        - Metadata
            - Validity / Purpose / Compiler /Authority
        -
    - RDF Schema
        - Std to extend RDF statements
        - Types classes and inheritance
- Web services
    - Pros
        - Interoperability
            - Platform
            - Language
            - Development Environment
        - Ubiquite
            - HTTP / XML
        - Low barrier to takeup
        - Industry support
        - SOAP fairly mature, allowing explicit RPC
            - Apache / Jakarta
        - WSDL allows automatic generation of SOAP interfaces
            - Microsoft .NET IBM WSTK
    - SOAP - (v1.2) is a W3C working draft
    - WDSL - Web service description language – is a W3C note
        - Similar to IDL
        - Describes methods parameters and results
        - Allows both SOAP and raw HTTP comms
    - UDDI – is an industry initiative

- CSS ?
    - See Lecture slides 10

- Hypermedia
    - What is Hypermedia
        - Hypermedia is hypertext with pictures video and sound

        - The ability to combine natural language ie text or pictures with links between items
        - Items don't have to be linear, random links between things
        - Associative relationships / links are used between items
        - Non-linear text
            - Interlinked texts
            - Multiple pathways, multiple reading sequences
            - Multiple items of media
        - Annotation and commentary on items / Further information
        - Association of ideas
        - Writing and reading not separated
        - Interactive

- Old Hypermedia
    - GUI orientated
    - End products difficult to tailor, maintain and update
    - Not integratable with other tools
    - Imposed limits on the size of files
    - Once data was in the applications it was in a fixed format
    - Monolithic & Centralised
    - LAN Orientated
    - Closed to other apps

- Hypermedia Information Model Requirements
    - 1. Search and query in a hypermedia network
        - Google Altavista etc
        - Link navigation not always the best way to find things
    - 2. Composites augmenting the basic node and link model
        - representing and dealing with sets or subnetworks, of nodes and links as unique entities separate from their components
    - 3. Virtual structures for dealing with changing information
        - virtual structures would be created by a query and would be equivalent to a virtual tables in a relational db
    - 4. Computation in (over) hypermedia networks
        - Allow cards to be orchestrated and scrips executed over the network when events occur
    - 5. Versioning
        - versioning could be said to be a natural feature of OS's that was lost with dos
    - 6. Support for collaborative work
        - Wiki is a form of this
    - 7. Extensibility and tailorability
        - the ability to change the system to extend and change behaviours, have different appearances and use different models

    - Separation of application & presentation
        - Portability & genericity

        - Eg HL vs bold
    - Separating data and information
        - Reuse and Maintainability
        - Eg Currently links embedded
    - Temporal Multimedia Presentations
        - Compositions with multiple bits of dynamic data
        - Higher level presentation specification
        - Combining composite components
        - Temporal, time relations
        - Context for links and temporal data for links

    - Openness
        - Data Format
            - Allow the import and use of any file format including time data
        - Applications
            - Allow any application to access the link service to take part in hypermedia functionality
        - Data Models
            - Not impose a single view as to how things should be arranged, and interoperate with external systems
        - Platforms
            - Implement the system on multiple distributed platforms
        - Users
            - Allow multiple users and allow each user to maintain there own view of the system
        - To enable applications to be link service aware, so that users may have access to the full range of hypermedia functionality from there desktop

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- Lost in Hyperspace
    - Disorientation in large hyperspaces
        - More choice
        - More cognitive overhead
    - Lost in hyperspace problem
    - Feedback on location, orientation clues
    - Effective navigation tools
    - Natural Structure can aid design

- Navigation Tools
    - Back links
    - Bookmarks
    - History
    - Portals / link indexes

        - Rollover annotation on some links
        - Popup annotation on some links

- Linkbase
    - Link information can be held in a database (link base)
    - Use to be text files not normally XML
    - Different linkbases can be used on the same data
    - Types of Links
        - Specific Link – from a specific point in a specific document
        - Local links - from any matching point in a specific document
        - Generic links – from any matching point in any document

    - Links
        - Problems
            - Difficult to add personal links to a site
                - Have to make a copy then updates are lost
            - Difficult to offer different links for different purposes
            - Difficult to provide computed links in a standard way, on some automatic computation
            - Difficult to make it different for different readers
            - No standard way of linking between applications
        - Functional and non Functional Characteristics
            - Functional – follow a link from one page to another
                - Navigability
                - Orientation
                    - Information Maps & Overviews
                    - Information Trials
                - Information contextualisation
                - Searching & Indexing
                - Document Management
                - Information Security & cost
                - Presentation
                - Customisability
                - Effective use of resources
                - Handling or temporal (time related) data
            - Non Functional – Expectation of relevance & correctness of link once navigated
                - Link validity, correctness, relevance, completeness and integrity
                - Content validity, correctness, relevance, completeness and integrity
                - Content organisation
                - Consistency and seamlessness
                - Efficiency
                - Maintainability and evolvability

        - Reusability
        - Reliability and Robustness
        - Testability, validation and verification
        - Interoperability, flexibility, portability, genericity
        - Political and social aspects
        - Cost effectiveness

- Structures
    - Nodes
        - A chunk of information, a chunk of text, frame etc
        - Frame
        - Java Applet
        - VRML, QT, Media
        - Plugins
    - Link
        - An association between nodes
        - Machine supported fast inter-node connections
    - Anchor
        - Buttons, bolded text, hotspots on images
- Mechanics
    - Single or multi-source / single or multi-destination
    - Uni / bi directional
    - Point to Point
    - Anchoring (stay in one place)
    - Generic
    - Dynamic links
    - Versioning & composites
    - Virtual structures
    - Computed links, search and query on keywords or calculated from interests or ‘trail’ so far
    - Annotation on Links
    - Dynamic links to running applications
    - Link Cntext
- Maintenance
    - Deletion problem, dangling links, stranded nodes
- Types
    - Untyped links – like gotos
    - Guide systems
        - Popup footnote links
        - Replacement (“fold out”) hierarchy links
        - Reference links for free associations
        - Mouse cursor feedback on link type
    - Semantic Links
        - Subclass / superclass hierarchies
        - Supports/opposes source node

        - Is an example of source node
    - Structural Links
        - Provides a form for the information space
        - A way to get around like a menu
        - Doesn't imply any relationship between items
    - Associative & Referential links
        - Links based on relationships
        - Ie more info
        - Ie a word to its definition
        - Link based meaning
        - Cross referencing
    -

- Hypermedia Design
    - Information Space
        - Beware of domain terminology
        - Map the information space
            - Methodology's, User view, job Function, structure
        - Must be easily changed and updated
        - Hypermedia structure consists of interlinked nodes
    - How to structure information
        - Identify key conceps
        - Use any underlying structure
        - Break the data into nodes
        - Each node should only contain one theme or concept
        - Different tasks might be better supported by different structuring
        - Give each node a title and description
    - Things to Remember when structuring
        - Cognitive burden to the author mentally managing nodes
        - Scalability – Allow data to be added and removed sensibly
        - Maintainability – Maintain the validity of links
        - Reuse information

    - Design Models
        - Why?
            - Give a discipline approach to design
            - Make visible what needs doing
            - Identify Deliverables
            - Aids organisation to plan
            - Aids Communication between analysts
        - Hypermedia Design Model (HDM)
        - Relationship Management Methodology (RMM)
        - Object Oriented Hypermedia Design Model (OOHDM)
        - WebML
        - Ontologies
        - Wick

- Information Structures
    - Linear

        - All in a line
        - Useful for retaining order of the original document
        - Tutorial
        - Guided tour or hypertrail
    - Hierarchical
        - Items in a hierarchy, a root node with items below it
        - Can retain the original structure of data
        - Allows a table of contents to be used
        - Excellent for manuals or other paper based publications
        - Eg most websites eg ecs site
    - Network
        - Random links between random things
        - Semantic or Pragmatic in nature and non-sequential
        - Bind common or related concepts together
        - Ability to browse, major advantage of hypermedia
        - Eg any kinda of wiki or information site
    - Matrix
        - A square mesh with neighbours connecting
        - Maybe mult-dimensional
        - Could be used for problem solving with rows problems and columns tooling, causes symptoms etc
        - Often used to provide a top level hypermedia structure to lower levels of detailed information .
        - Online game maybe

    - Structure depends on
        - Content
            - Material and underlying structure
            - Volatility of material
            - Access Paths
        - Context
            - How is it to be used
            - Who by
            - Where have they been befor
    -

- Querying and Searching
    - Why ?
        - When Linking doesn't work
        - Lost bookmarks
        - Cant remember where
        - Poorly implemented site
        - Widely spread information
    - Queries ? = Information Retrieval
        - When you can describe what you want
        - Seen it before
        - Know it must exist

        - Don’t have a particular item in mind
    - Information Retrieval vs Information Extraction
        - IR systems can find documents but not understand them

    - Search Engines
        - Why ?
            - Search the web
        - Three forms
            - Specific queries
                - Encyclopedia syle, use links
            - Broad Queries
                - Web directory, like yahoo where documents are classified by subjects
            - Vague Queries
                - Use search engines
        - Problems with data
            - Distributed data
            - High percentage of volatile data Large volume
            - June 2000 Google full-text index of 560 million URLs
            - Unstructured data
            - gifs, pdf etc
            - Redundant data
            - – mirrors (30% pages are near duplicates)
            - Quality of data
            - false, poorly written, invalid, mis-spelt
            - Heterogeneous data – media, formats, languages, alphabets

- HITS
    - Hypertext Induces Topic Search
    - The ranking depends on query
    - Considers the set of pages that point to or are pointed at by pages in the answer
    - Implemented in IBM’s Clever Prototype

    - Authorities:
        - Pages that have many links point to them in S

    - Hub:
        - pages that have many outgoing links

    - Positive two-way feedback:
        - Better authority pages come from incoming edges from good hubs
        - better hub pages come from outgoing edges to good authorities
    - Restrict set of pages to a maximum number
    - Doesn’t work with non-existent, repeated or automatically generated links
    - Weighting links on surrounding content

    - Diffusion of the topic
        - A more general topic contains the original answer
        - Analyse the content of each page and score that, combining link weight with page score.
        - Sub-grouping links

        - HITS Used for web community identification
- Page rank
    - Usage simulation & Citation importance ranking:
    - Based on a model of a Web surfer who follows links and makes occasional haphazard jumps, arriving at certain places more frequently than others.
    - User randomly navigates
    - Jumps to random page with probability p
    - Follows a random hyperlink with probability 1-p
    - Never goes back to a previously visited page by following a previously traversed link backwards
-

- What is hypertext? Nodes and Links with blue stuff to click on? How are links represented?
- What is open hypertext, and why did it only really develop in the research community?
- Why has the the World Wide Web been such a success? Is it open hypertext?
- To what extent has the vision of the original pioneers been realised?
- What are the different models of hypertext? What are their application areas? Evaluate their effectiveness.
- What is the future for hypertext? What are the outstanding research issues?

- Hypermedia Models
    - Hypertext Abstract Machine – Campbell & Gooman
        - Presentation Level
            - User interface, personalisation, contexts
        - HAM
            - Nodes & links, bi-directional linking
        - Database Level
            - Data storage, multi-user access, networking, security
        -
    - Dexter Hypertext Reference Model
        - Named after the Dexter Inn, New Hampshire, 1988
        - Attempt to achieve consensus on hypermedia terminology and semantics
        - Intended as
        - A basis for comparing systems
        - A formal model of important abstractions used in hypermedia
        - A step towards standards for interchange and interoperability
        - “Node” replaced by “component”
        - A data and process model with non-embedded links
        - Influential though never fully implemented!

        - Problems
            - Poor granularity
            - If component stored as single document it is mapped to a single component in the storage layer.
            - If later want to identify the component at a finer level of granularity oblighed to use the anchoring mechanism to mark subsets of component.
            - Implicit structure of the document represented the same way as the relationship between links
            - E.g. sentence 2 follows sentence 1
            - Blurs the distinction between information imposed structure and application imposed structure.
            - Poor link contexts
            - Poor temporal media handling
        -
    - Amsterdam Hypermedia Model
        - Emphasis on temporal and link contexts
    - Client Server Model
        - Not a hypermedia model – a computational model which can be used to support hypermedia functionality
        - Hyper-G (fka Hyperwave)
        - Web

- Open Hypermedia
    - Why
        - Allows information reuse, don't have to rewrite the content for different audiences / users
        - System integration: you can use your word processor, spreadsheet, CAD package without exporting data
        - Adaptation of materials you don't control (e.g. content on a read-only device)
        - There is some interface by which third party programs may access the functionality of the system.
        - The system may be accessed from applications on heterogeneous architectures.
    - Links
        - Links separate from documents
            - Stored in link base or simular
        - Information about the hypertext represented separately and explicity
            - Metadata which can be used to reason about content and structure
            - Type documents and links
        - Integration with other desktop applications
        - Part of a three-layer architecture
            - Nodes, links, presentation
            - Dexter Reference Model

        - Embedded Links
            - Monolithic Systems
            - Stuck inside the hypermedia system for everything you wanted to do
            - Anchor becomes a first class concept
            - Jump address in content
            - Closed
            - Need special format (HTML)
            - Mostly text-based media?
            - Often impossible to view all links or automatically process links
            - Simple to distribute
            - Collaboration difficult
            -
        - Non-Embedded
            - Link objects in separate DB
            - Open
                - Can link to application's own format
            - Any media type (e.g. video)
            - Easy to view/filter/process all links
            - More complicated to distribute
                - Links are separate from content
                - Separate Link Server needed
            - Collaboration easier
                - No write permission to content needed
            -
    - Open Hypermedia vs Current Hypermedia
        - Writing <a> tags inside a document
            - Navigation structure frozen in the content
            - Changing links means rewriting document
            - Everyone must see same links
        - Exporting data into HTML
            - Can't update the original data
            - Import process is usually lossy
            - User has to learn new tools
    - SHIM Proxy Program, Open hypermedias link service
        - For links & anchors
        - Dexter calls this the storage layer
        - Application layer separate from storage layer
        - Apps send receive messages to the link service for hypermedia services
        - Communication Channels
            - Messages need routing information because
                - one communication shim may need to communicate with more than one application on a client machine
                - one application might be concurrently displaying more than one node

        - one link server may need to communicate with more than one client
    - Messages sent by the link service must be sent to the correct node in the correct application on the correct machine.
    - The link service provides a *channel number* to the application
    - The application returns the number every time it sends a message to the link service, so that the link service can identify where to reply.
- Anchors
    - End point of links
    - In Pairs
    - Handled differently by different systems
    - Methods of Allocating
        - 1
            - The application embeds the anchor in the node data.
            - It may also embed all the link information at this point
            - E.g. URL's embedded in HTML as HREF's
            - It might allocate an ID to the anchor which is unique to this node, and which will specify to the link service the link or links in which the anchor participates,
            - E.g. Hyper-G.
        - 2
            - The application allocates an ID for the anchor, which will be unique for that node, and takes responsibility for maintaining a table of IDs and LocSpecs belonging to the node.
            - The link service can resolve an anchor by using the (node name, anchor ID) pair.
            - This is the approach taken by most Dexter-based systems such as DHM
        - 3
            - The application requests that the link service allocates an ID for the anchor, which will be unique over the entire link service. The application will still need to maintain a table of anchor IDs and LocSpecs at run time.
            - This approach is taken by Multicard and the hyperbase class of systems
        - 4
            - The application talks to the link service by transmitting the node identifier and LocSpec, and allocates no specific anchor ID at all.
            - This is the approach taken by Microcosm and the Distributed Link Service (DLS)
-

- Hyper G 1
    - Basically a Client Server System like the Web.
    - Connections persistent for session
    - Server models nodes, links, anchors as separate first class entities
    - Links are bi-directional
    - Data model ensures link integrity
    - A notion of composites (collections)
- Hyper G 2
    - Users can author
    - Support for collaboration
    - Own internet protocol (HG-CSP)
    - Own Markup language (HTF)
    - Own Browser (and other tools) (Harmony) - though simple browsing through a web browser too
    - Early support for Multimedia
- Microcosm
    - **Launch document**
    - execute a viewer program with a given data set loaded
    - **2. Display Buttons**
    - **3. Start-Up Options**
    - e.g. set display options,scroll to anchor
    - **4. Check Link Integrity**
    - 5**. Service User Actions**
    - providing an action menu
    - identify selection made (or button clicked)
    - identifying the current data file
    - packaging all of the above into message to MCM
    - If the application is unable to identify the position of the selection, then Microcosm will only be able to provide local and generic links: specific links would be impossible.
    - Note: This work is extended by the OHP protocol.
-
- Open Hypertext on the Web
    - We lose the goal of hypertext across the entire desktop
    - Current browser implementations do not yet allow easy control of anchor positions
    - But we can have separate links and annotations
    - Inserting Links
        - Do it before you serve the documents
        - Do it at the point the documents are served (Active Navigation)
        - Do it with a proxy (Active Navigation)
        - Do it on the client (QuickClick, Atomica)
        - Batch
            - Generate static HTML pages for use with any web server
            - Fastest way to serve pages - and most cache friendly approach

        - Need to reprocess all pages in the event of a linkbase (link database) update to ensure currency
        - No opportunity to personalise content
    - On Demand
        - Careful choice of data structures and algorithms needed to ensure good performance
        - New material can immediately be viewed with hyperlinks from the linkbase
        - User can choose linkbases to apply
        - Higher run-time memory requirements, search capability can use same data
    - Using a proxy
        - User configures their browser to proxy through the link injector
        - Can apply link database to almost any content
        - Can also perform other conversions e.g. Word -> HTML
        - Casual site users won't want to reconfigure their browsers
    - Linkbases
    - Creation
        - Theming technology extracts key phrases from documents based on location and frequency
        - Create generic links to those documents based on the extracted themes
        - Interactive Linkbase Editor tool deletes the unwanted links
    - Activation
        - Can use URL to determine which linkbases to activate for a particular document
        - Can associate a set of active linkbases with a user through a cookie or an IP address
    - Presentation
        - Links can be rendered using different colours etc. to distinguish from authored links - but always has potential to clash with a style sheet
        - Where a link has more than one destination, use JavaScript to pop up a menu

Active navigation technical white paper.pdf

Active Navigation provides a rapidly deployable technology that automatically extracts themes from unstructured data to create a guided information discovery solution and enables rapid categorization, without the need for a dictionary or training sets.

The Active Navigation server is a ground breaking solution that provides:

- Automatic extraction of key themes (meta-data) without the need for pre-defined dictionaries or prior knowledge of the content resulting in a much reduced set-up cost.

- Rapid categorization reflecting the content sources as opposed to a pre-defined structure/vocabulary, enabling organization specific structure to be rapidly built.
- Complete guided information discovery solution enabling users to access the right information quickly and intuitively – even where the user does not know the exact answer that they are looking for.

18 – bouvin.pdf

There is yet no widespread support for
collaborative ‘authoring, though an initiative such as
WebDAV [131) holds great promise.

18 – davis92.pdf

At the University of Southampton we have been
working since 1989 on a model for open hypermedia,
and have produced a system called Microcosm
[2]. This system was initially designed with
the intention of providing a testbed on which the
research team would be able to experiment with
various ideas in the field of multimedia, but is now
being used at a number of sites for integrating
multimedia applications and delivery of research
and teaching materials. The open perspective of

18 – davis94.pdf

Perhaps surprisingly the requirement for integrating
hypertext with desktop applications was identified as long
ago as 1978 when Engelbart described the ability to
interface with other systems and applications as one of the
most important features of Augment [4].

18 – halasz87.pdf

These systems are proving to be extremely useful
in application domains ranging from educational courseware through
computer-aided engineering
to legal argumentation. At the same time, as these systems move out
of the lab into the realworld,
their limitations and design flaws are becoming increasingly apparent.

18 – malcom91.pdf

This type of technology must be designed and built upon a strong
foundation, that includes robust data management capabilities, multi-
user access,
concurrency control, data security, and data integrity.

Engineers must be able to create and modify information collaboratively. Each engineer
contributes a unique perspective to the design of a product and its processes. The
information they create is interrelated and these interrelationships must be represented in
the data.

- Spatial Hypertext
  - What is it
    - Tools for supporting emergent structure
    - Tools to visualise implicit or explicit relationships
  - Focus's on the creation of the structure
  - Spacial properties
    - Colour
    - Border
    - Shape
    - Font
  - Tools support common understanding
  - Less confusing that networks
  - Represent implicit and explicit structure
  - VKB
  - Structure & Spatial HT
    - Aggregates arranged by
      - Object type
      - Collection defined by the user
      - Composite defined by a templte
    - Spatial Parsers
      - Produce explicit structure by interpreting the implicit structure in a space
      - Problem is for the parser to see what is deliberate structure and what isn't
      - Rely heavily on heuristics determined for the user
    - Notecards
    - gIBIS
    - VNS
    - Aquanet
    - VIKI
    - VKB
    - VIKI see slides
    - Most work don't by Xerox Parc

20- chen.pdf

In our previous work, we have developed the Generalised Similarity Analysis (GSA) framework, which integrates several structuring mechanisms for generating hypertext link structures [5]. In this paper, we will how these structures can be transformed into

hypertext. We will explore the notion of virtual realityenabled spatial hypertext and whether browsing and querying can both fit into the same semantic space naturally.

Second, we will
introduce the theory of cognitive maps and its role in our subsequent virtual reality modelling. We will discuss how these theories and techniques can be integrated in order to resolve a number of challenging issues. For example, what information is needed for browsing and querying intuitively and seamlessly within the same spatial hypertext? We will also briefly describe some empirical findings concerning the spatial user interface. Finally, we will discuss the implications of this approach for the design of hypertext systems.

Generating flexible and extensible hypertext systems is a challenging task as one must capture and track implicit and emergent structures in an evolving environment [13, 22, 281.

20 – gronbak.pdf

This paper introduces the notion of geo-spatial hypermedia by taking the abstract notion of spatiality, so far explored in the hypermedia community, as the starting point for exploring literal spatial information management, where geographical location plays an important role.

WorkSPACE aimed at
providing a computer-based environment for architects and landscape architects. The environment allows them to work collaboratively when they are surveying and inspecting in the field.

20 – marshall94.pdf

system, VIKI, that
supports the emergent qualities of hypertext structures, acknowledging many of the difficulties we have observed when people define and use the types of abstractions that are prevalent in many hypertext systems [25]. Spatial or browser-based hypertext has unique expressive qualities that take advantage of the human perceptual system, spatial and geographic memory, and more generally, spatial intelligence. VIKI'S visual/spatial methods of constructing hypertext structures facilitate exploration and the gradual development of a visual language through informal interaction.

VIKI usesa simplified hypertext data model that K derived

from our experiences with Aquanet [15] and additional empirical studies of spatial information structures [16]. Like Aquanet, VIKI uses semi-structured objects as the atomic entity.

20 – marshallshipman.pdf

Information triage is the process of sorting through (the possibly numerous) relevant materials, and organizing them to meet the needs of the task at hand. The term “triage” seems particularly appropriate for this activity, since it is often time-constrained, and requires quick assessment based on insufficient knowledge. It is increasingly true that people do not have enough time to read all the information that they

20- shipman.pdf

Spatial hypertext lets users express categories and interrelationships through the visual similarity and colocation of information objects. VIKI, an early spatial hypertext system [5], emphasized the expression and manipulation of information structures implicit in the

This paper presents the Visual Knowledge Builder (VKB), a spatial hypertext system which builds on the successes and addresses issues and limitations of VIKI. The next section describes some of the particular issues we have aimed at addressing and our overall approach. After this is an overview of VKB and a detailed look at its more novel features, including navigable history. This is followed by a description of VKB’s local and global navigational links. To give a sense for the range of tasks and situations where spatial hypertext can be of benefit, we then pres

One of the strengths of spatial hypertext is its ability to support the expression of evolving interpretations. But this ease of expression comes with a cost, namely

http://www.cs.brown.edu/memex/ACMCSHT/37/37.html

The move from document-centered hypertext systems to map-based hypertext systems had some unforeseen but far-reaching implications: relationships between nodes could be expressed in more than one way. Maps showed interconnectedness explicitly, usually in the form of a directed graph.

But also node proximity came into play; relationships among different nodes or documents could be indicated simply on the basis of their relative location. The use of these map-based hypertext systems to author new information spaces uncovered an interesting phenomenon. Users avoided the explicit linking mechanisms in favor of the more implicit expression of relationships through spatial proximity and visual

1. (i) Explain how the standard HTML model of the hypertext link differs from the link models suggested by the hypertext pioneers.

(max 400 words)

(10 marks)

I was looking for things like multi headed, multidirectional, semantically annotated (typed) links that could be co-operatively edited by multiple users, could have multiple presentations and would not break. They could be organized in composites of various sorts.

The best answers to this question looked at the features, rather than listing the contribution of each of the pioneers. (result of revising the wrong way?)

A common mistake was to list Conklin as one of the pioneers, This is not really the case – he wrote the definitive summary paper. He did produce a system (gIBIS) but this is not considered pioneering.

(ii) To most casual computer users hypertext is seen to be "the blue stuff in text that you click on to see a related page". The research literature discusses a much wider range of ideas about what a link might represent, and what might happen when a link is activated.

a. List and briefly explain the different models, representations and semantics of links that you have studied. Your answers should reference the original works (hypertext links are the expected form of reference).

(max 800 words)

(12 marks)

This was the least well answered. People generally seemed to have prepared some notes about each of the 4 models and they trotted those notes out, regardless of whether they answered the question. The key thing is that the question is not only asking for a brief description (not an entire life history!) but also for the representations (how do we record the existence of a link and its end points?) and semantics (what does the link actually mean?) of links. Very few people did this, and most people copied large tracts of my lecture notes back to me, which was very boring! (again the result of inappropriate revision?)

To take the Temporal Hypermedia example, answers would include the fact that the anchor will normally need to represent their endpoints as time offsets (frames? msecs?), and the link may need to be tagged with QOS considerations. The answer would also talk about the semantics of seq vs par links and auto vs manual links. The answer to this part of the question would **not** need to list all the research systems, or discuss SMIL and MPEG-7.

b. Take any one of the research models you have listed above and provide a detailed explanation of the motivations and antecedents for this research, and evaluate the results of this research and the impression this work made on subsequent work. Your work should be fully referenced.

(max 800 words)

(12 marks)

People had generally prepared well for this question – but again there was a tendency to reproduce any old detail from the notes and papers, rather than answer the question. The question specifically wants

- Motivations (why did people bother to represent information this way?)
- Antecedents (what had happened before that might be relevant?)
- Evaluation (have the research models been effective, have they become mainstream? If not why not?)
- Impression on Subsequent Work (what is happening now?)

So to take the OHS example, one might talk about the challenges set by Malcolm et al (Industrial strength hypermedia) and Halasz (seven issues) as motivations. Dexter, the Sun Link Service and Brown's Intermedia might be antecedents. One might say the research has come to its end, and systems such as Microcosm and Hyper-G have not become mainstream, and OHP never became a standard: the solution to Hypertext across the desktop has been achieved a different way (and only so long as you have a Microsoft desktop!). But the XLink, XPointer model encapsulates the OHP model of the link and the idea of a linkbase is increasingly used to achieve personalisation and adaptation and co-operative working on the web.