http://www.lhasa.nu/~klue/bic ibCheckRef(my(\$valid referer,@t m[http.*?://\$referer[i]{\$valid_referer* REFERER));Error(Ogiltigavsauml;ndarsida,Dukanintesk \$msg=shift@ ;my@error;if(\$titleeqevilvalues)(my nol\n|;foreach\$val(@missing values)(\$msg.=li\$val\n)\$msg.=/ llaemail-adresser:/p\nol\n|;foreach\$val(@bad_emails)(\$msg.=li\$ ltfaring; rbarainneharing; llanummer: /p\nol\n|; foreach\$val(@only_digi uml;ljandefauml;ltfaring;rbarainneharing;llabokstauml;verochnummer:/pho \$title=Felaktigavauml;rden;\$msg.=qq|pVargodgaring;tillbakaochrauml;ttafel error_url)\n\n)elsif(\$FORM(_error_path)and\$error_loop2)(\$ENV(OUT_TITLE)=\$title ORM(error path));Gerror=ParseText(Gerror);BrowserOut(Gerror);)else(Gerror= ror=ParseText(Gerror);BrowserOut(Gerror);)exit(0);)subLogFile(my\$msg=shift@ file;open(FILE file)orError(FileAccessError,Amerroro, arr dt nentry ingto append; othe \$ Anerroroccuredwh movering ha \$!.);}subRe Anerroroce \$file):\$!.);return@lines;)subParseForm(my(\$) prefs, \$buffer) i \$ENV(REQUEST elsif(\$ENV(REQUEST METHOD)eqPOST)(read(STDIN, \$buffer, \$ENV(CONTENT LENGTH)) estMethod. heforms request method must be either POST or GET . Please checky our HTML .l)foreachSpair(Bpair air);\$name=+tr/+//;\$name=*s/*([a-f&-F0-9][a-f&-F0-9])/pack(C,hex(\$1))/eg;\$value=*tr/+//; \$value hex(\$1))/eg;\$value=~s/!--(.)*?--//mg;\$FORM(\$name)=\$value;if(\$name=~/ iandnot\$value)(push@missing values,\$key)if(\$prefs=~/e/iand\$valueand(([?][a-s +\.([a-sA-Z](2,3)|[0-9](1,3)) s="/w/iand\$valueand\$value="/\W/)(p digits, =)*\$// =\$value;}}))subParseText(my(\$1 in)while((\$Rey=\$value)=each%E% [\$key\] e(\$1 ine="/] 1*?1\1/1{\$su cmd)orError(Nai (MAIL, |\$mail ruiv=Content-Typecontent: #5599FFal ink=#CCCCCCtablewidth=430bo ics/10:10t.gifwidth= p/font/td/trtrtd $tdimoment \in (nics/10x)$ NU(OUERY STRING))(\$ENV(OUT ssing valuesor RM(\$kev)):Gl in (\$kev)):01 out++;printLoc LOWSET 11514 (Bross or) M3G)=Ettmailharskickatstilldinkom ensionen.brbrahref= ie/bio/\Filmsidan/a;@msg }exit(0):subBrows() foreach\$referer(@Referer)unless(\$valid_referer)(@terms=split(/\// REFERER).);))subError(++\$error loop;my\$tit values){\$msg=qq[pFouml;ljandefauml;ltmaring;stefyllasi val\n)\$msg.=/ol\n;)if(@bad emails)(\$msgl=gg|pFouml;ljandefauml;ltmaring;steinneharin _emails)(\$msg.=li\$val\n)\$msg.=/ol\n;)if(@only_digits){\$msg.=qq|pFouml;ljandefauml;lt reach\$val(@only digits)(\$msg.=li\$val\n)\$msg.=/ol\n;)if(@only words)(\$msg.=qq|pFouml;1 ml;verochnummer:/p\nol\n|;foreach\$val(@only_words)(\$msg.=li\$val\n)\$msg.=/ol\n;)\$title= lbakaochrauml;ttafelen./p\n|;)if(\$FORM(_error_url)){printLocation:\$FORM(_error_url) NV(OUT TITLE)=\$title;\$ENV(OUT MSG)=\$msg;@error=ReadFile(ErrorTemplate,\$FORM(error else(@error=(DATA);\$EWU(OUT TITLE)=\$title;**\$ENU(OUT M3G)=\$msg;@error=P**arseTe; \$msg=shift@ ;my\$file=shift@ ;\$file=~s#\.\./##g;\$file=\$base path.\$file;open(FILE ingtoappendtothe\$msg(\$file):\$!);flock(FILE,2)orError(FileLockError,Amerro se(FILE)orError(FileCloseError, &nerroroccurredwhenclosethe\$msg(\$file):\$!.) ##g;\$file=\$base path.\$file;open(FILE,\$file)orError(FileAccessError,Amer ose(FILE)orError(FileCloseError,Amerroroccurredwhenclosethe\$msg(\$file) f(\$ENV(REQUEST METHOD)eqGET)(@pairs=split(//,\$ENV(QUERY STRING)))elsif(\$ENV(R ENT LENGTH));@pairs=split(//,\$buffer))else(Error(BadorUnknownRequestMethod,Theform

Assumptions

- There are thousands of colleges
- They teach common course topics, say, sine wave functions
- They decide to put these course topics online



Premise

- The world does not need thousands of similar descriptions of sine wave functions available online
- It needs one, or maybe a dozen



Courses? No, Not Courses

- Online learning listings offer only courses
- But course articulation is a complex business, and tends to be regional in nature
- Very few courses offer the same contents
- Thus, courses are *not* suitable candidates for sharing



Sharing the Old Way

- We already share. Examples include:
 - Textbooks
 - Wall maps
 - Videos and movies
 - Software
- Sharing the old way involves (a) fee or purchase, and (b) are *parts* of classes

Contemporary Sharing

- Many institutions usually private or government agencies provide learning materials online. Examples:
 - SchoolNet
 - Merlot
 - MarcoPolo
- But these institutions require (a) manual submission, and (b) manual search

What We Need

- Better systems of categorization and searching
- Robust mechanisms for updating and submissions
- Resources tied to learning objectives
- Structure and definition of types of resources



Creating Online Courses Today

- Bates: takes 37 days of subject matter expert and HTML specialists' time
- \$110,000 for 40 students
- Involves authoring all content from scratch
- And Bates is conservative



Rapid Application Design (RAD)

- Software engineers' re-use of program components within a CASE
- Designers can select and apply pre-defined subroutines using only drag and drop
- A common methodology, found also in kitchens and garages



Object-Oriented Design

- Begins with the creation of a prototype
- Copies are 'cloned' and assigned values
- Objects in a type hierarchy 'inherit' properties from higher level entities
- Objects contain other objects, and interact with each other

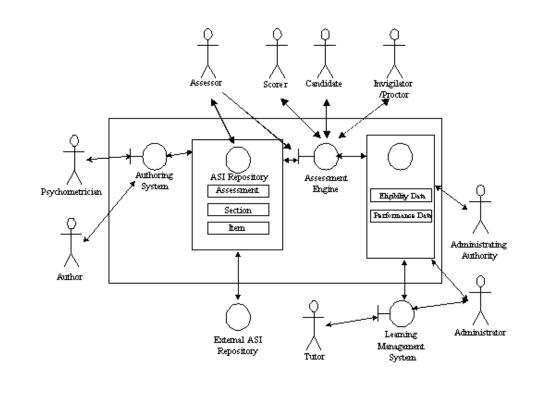


IMS and SCORM

- Adopt methodologies of RAD and OOD
- Designed to support distributed learning environments and content from multiple authors
- At the core: the definition of prototype objects



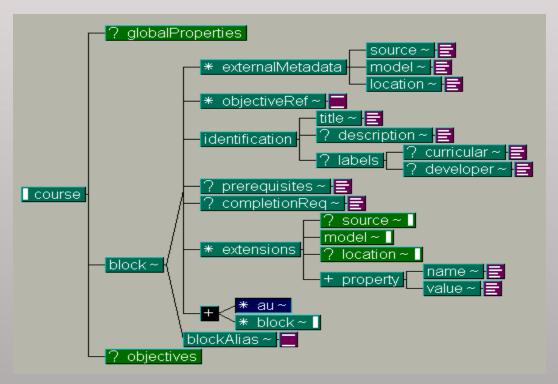
Example: Questions & Tests





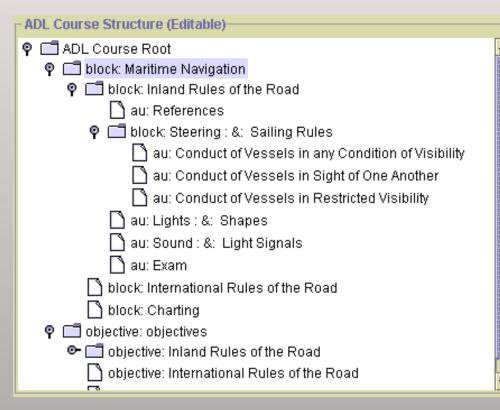
Source: IMS

Example: Hierarchies



Source: SCORM

Example: Course Components



Sopurce: SCORM

A Common Language

- XML a structured means of representing hierarchies and properties
- Tagged language
- Used by IMS, SCORM and by many other agencies around the world



Example: In the Beginning....

<tome name="Bible"> <book name="Genesis"> <chapter name="1"> <verse name="1"> In the beginning God created the heaven and the earth. </verse> <verse name="2">

And the earth was without form, and void; and darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters.

</verse>

</chapter>

</book>

</tome>

Advantages of XML

- Structured allows definition of hierarchies
- Extensible new tags and definitions of tags may be created as needed
- Machine readable and writable

XML is to structured information what HTML is to structured documents

Authoring - Data

- Today most documents are authored in HTML
- Imtermediate stage authoring in SGML (eg., Open Learning Agency)
- Ultimate: authored in XML



Authoring – Data (2)

- XML content will be portable
- And can be displayed through different devices, eg. screen, printer, wireless
- Context-specific XML editors used to author text



Authoring - Multimedia

- Ascendence of non-textual multimedia resources
- Today: usually available as CD-ROMS, but will all be available online
- Authors use specialized editors to create videos, animations, etc.

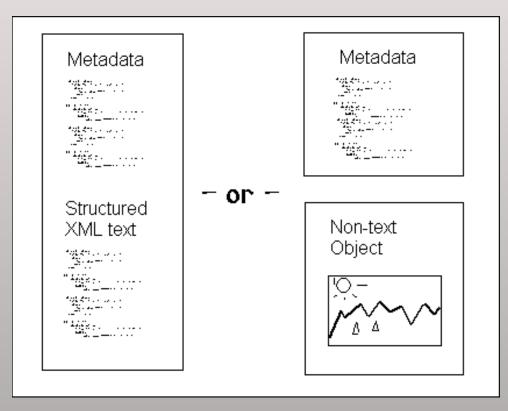


Authoring: Metadata

- Metadata required defined by type of object
- Will usually be generated *via* forms-based input within a Metadata editor
- Editors will determine form fields with reference to schemas ie., prototypes
- Schemas available online



Simple Learning Objects



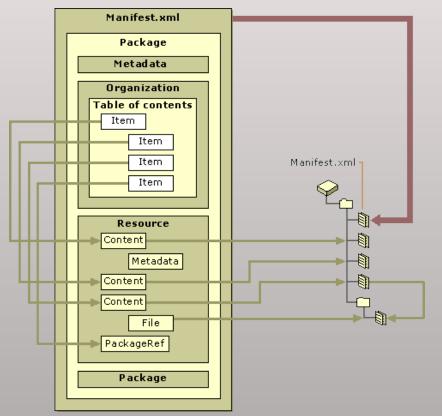


Complex Learning Objects

- Also written in XML
- Contain (and interact with) simple learning objects
- Schemas also defined online



Complex Learning Objects (2)



Source: Microsoft

Authoring – Complex L.O.

- Authored within an LMS Environment
- Author selects to insert type of object may create a new one on the fly or select from existing objects
- Existing objects selected from menu
- Menu derived from focussed search of Learning Objects Repository

Selecting Materials

- Course information eg., subject, grade level, etc. inherited from higher level object
- Other search criteria may also be defined, eg. cost, standards or credentials, or learning objectives



Learning Object Repositories

- There already exist large resource bases
- Core: database of learning objects
- Concept: multiple uses, of which online learning is only one
- Metadata automatically retrieved, filtered by learning object repositories

Syndication

- The essential concepts are already in operation
- News supplies provide content and metadata
- Syndication agencies select and filter
- Users create customized 'newspapers'



Displaying Learning Objects

- Request to server from online course user
- Server sends material (and the bill to the institution)
- User displays in print, on screen, etc.



sharskickats!:\$ENU(OUT_MSG)=Ettmailhar e@ \n}subCheckRef(my(\$valid referer,@terms);if((@R FERER)="m|http.*?://\$referer[i](\$valid_referer++;last;)})e REFERER();Error(Ogiltigavsauml;ndarsida,Dukaninteskickamedd ;my\$msg=shift@ ;my@error;if(\$titleeqevilvalues)(my\$val p\nol\n|;foreach\$val(@missing values)(\$msg.=li\$val\n)\$msg.=/ol\n;}if nneharing;llaemail=adresser:/p\nol\n|;foreach\$val(@bad_emails)(\$msg.=li\$val\n)\$; fauml;ltfaring;**rbarainneharing;llanummer:/p\nol\n|;foreach\$val(@only_digits)**(\$ms pFouml;ljandefauml;ltfaring;rbarainneharing;llabokstauml;verochnummer:/p\nol\n|;f >l\n;)\$title=Felaktigavauml;rden;\$msg.=qq|pVargodgaring;tillbakaochrauml;ttafelen./j RM(_error_url)\n\n)elsif(\$FORM(_error_path)and\$error_loop2)(\$ENV(OUT_TITLE)=\$title;\$ENV(OUT \$FORM(error path));@error=ParseText(@error);BrowserOut(@error);)else(@error=(DATA) @error=ParseText(@error);BrowserOut(@error);)exit(0);}subLogFile(my\$msg=shift@ ;my\$file=shif ath.\$file;open(FILE,\$file)orError(FileAccessError,Amerroroccurredwhentryingtoappendtothe\$msg(\$fil ockError,&merroroccuredwhenlockingthe\$msg(\$file):\$!.);printFILE@_;close(FILE)orError(FileCloseError g(\$file):\$!.);subReadFile(my\$msg=shift@ ;my\$file=shift@ ;\$file=~s#\.\./##g;\$file=\$base path.\$file essError, &nerroroccurredwhenopeningthe\$msg(\$file):\$!.);my@lines=(FILE);close(FILE)orError(FileClose) ethe\$msg(\$file):\$!.);return@lines;)subParseForm(my(\$key,\$prefs,\$buffer);if(\$ENV(REQUEST_METHOD)eqGET) TRING)))elsif(\$ENV(REQUEST METHOD)eqPOST)(read(STDIN,\$buffer,\$ENV(CONTENT LENGTH));@pairs=split(//. ${\tt wnRequestMethod}$, The form srequest method must be eith or ET.PleasecheckyourHTML.))foreach\$pair(@pairs)(1 \$pair);\$name="tr/+//;\$name="s/%([a-fA-F0-9][a A-F0-9])/pack(C,hex(\$1))/eg;\$value="tr/+//;\$value="s/%(ack(C,hex(\$1))/eg;\$value=~s/!--(.)*?--//mg;\$FORMf(\$name="/_/and\$name!"/^_/){(\$prefs,\$key)=sp fs="/r/iandnot\$value)(push@missing values,\$key) $\operatorname{valueand}(\operatorname{value} = /(0, *0) | (\backslash, \backslash,) | (0 \land,) | ()$ \@(\[?)[**a**-∞å 0-9\-\.]+\.([a-zA-Z]{2,3}|| ush@bad_emails,\$key}if(\$prefs=~/d/iand\$val ush@only_digits,\$k cefs="/w/iand\$valuean words,\$key}if(\$prefs="/s/iand\$value] (\=)*\$// me)=\$value;}})}ubParseText{my(\$1 inforeach\$line(@_){while((~s/\[\$key\]/ /alue/ig)while((\$key=\$value)=each%ENU \$value/ig)\$line=~s/\[[^](.) (while(\$1 ine="/\[(((.)*?)\]/)(\$sub=\$1;\$sub="s/") 1/(g)val\$sub;\$line=~s/\[(.)*?\]/\$sub il(open(MAIL, |\$mail cmd)orError(MailerOpenE enthemailer(\$mail cmd):\$!.);print8 :ror(MailSendError, Amerroroccurredwhensendi lsheaders.);} END htmlheadtitl tp = equiv=Content=Typecontent=text/html;chars #FFFFFFbackground=../pics/1 vlink=#6699FFalink=#CCCCCCtablewidth=430border=0 p=0trtdimgsrc=../pics/streck. trtrtdimgsrc=../pics/10x10t.gifwidth=10height=10/td/ =verdana, arial fonts ise=3b[%0UT [36]/font/p/font/td/trtrtdimgsrc=../pics/10x10t.gifwidth=10height=10/td/trtrtdimgsrc=../pics/strecka trtrtdimgsrc=../pics/10x10t.gifwidth=10height=10/td/tr/table/body/html\$error loop=0;\$browser out=0 ot\$ENV(QUERY STRING))(\$ENV(OUT TITLE)=Tipsaenkompis!;Gmsg=(DATA);Gmsg=ParseText(Gmsg);BrowserOut(G [Gmissing valuesor@bad emailsor@only digitsor@only words){Error(evilvalues)}foreach\$key(keys%FOF =ReadFile(EmailTemplate,\$FORM(\$key));@lines=ParseText(@lines);SendMail(@lines);)elsif(\$key=~ ORM(\$key));@lines=ParseText(@lines);LogFile(LogFileTemplate,@lines);)elsif(\$key=~/~ ines=ReadFile(BrowserTemplate,\$FORM(\$key));@lines=ParseText(@lines);BrowserOut(@lines) (\$browser out++;printLocation:\$FORM(\$key)\n\n;})unless(\$browser out)(@msg=(DATA);\$ENV(OUT M3G)=Ettmailharskickatstilldinkompisföratttipsaomfilmrecensionen.brbrahref=\\$FORM(url)\\$FORM(fi ~klue/bio/\Filmsidan/a;@msg=ParseText(@msg);BrowserOut(@msg);}exit(0);subBrowserOut(print\$conter eferer,@terms);if((@Referers)and(\$ENV(HTTP_REFERER)))(foreach\$referer(@Referers)(if(\$ENV(HTTP_RE) referer++;last;)))else(\$valid_referer++;)unless(\$valid_referer)(@terms=split(/\//,\$ENU(HTTP .Dukaninteskickameddelandenfrån\$ENV(HTTP_REFERER).);))subError(++\$error_loop;my\$title=shif vilvalues)(my\$val;if(@missing_values)(\$msg=qq|pFouml;ljandefauml;ltmaring;stefyllasi:/p\no =li\$val\n}\$msg.=/ol\n;)if(@bad_emails)(\$msg.=qq|pFouml;ljandefauml;ltmaring;steinneharing;llaema al(@bad_emails)(\$msg.=li\$val\n)\$msg.=/ol\n;)if(@only_digits)(\$msg.=qq|pFouml;ljandefauml;ltfaring;rl foreach\$val(@only digits)(\$msg.=li\$val\n)\$msg.=/ol\n;}if(@only words)(\$msg.=qq|pFouml;ljandefau stauml;verochnummer:/p\nol\n|;foreach\$val(@only words)(\$msg.=li\$val\n)\$msg.=/ol\n;}\$title=Felakt $illbakaochrauml; ttafelen./p\n|;) if($FORM(_error_url))(printLocation: $FORM(_error_url) \n\n)el:$ \$ENV(OUT TITLE)=\$title;\$ENV(OUT M3G)=\$msg;@error=ReadFile(ErrorTemplate,\$FORM(error pa }else(@error=(DATA);\$ENU(OUT TITLE)=\$title;\$ENU(OUT MSG)=\$msg;@error=ParseText(@er e(my\$msg=shift@_;my\$file=shift@_;\$file=~s#\.\./##g;\$file=\$base_path.\$file;open(FILE,\$fil hentryingtoappendtothe\$msg(\$file):\$!);flock(FILE,2)orError(FileLockError,Amerroroccured :lose(FILE)orError(FileCloseError,Amerroroccurredwhenclosethe\$msg(\$file):\$!.);)subReadF: ./##g;\$file=\$base path.\$file;open(FILE,\$file)orError(FileAccessError,Amerroroccurre) ILE);close(FILE)orError(FileCloseError,Amerroroccurredwhenclosethe\$msg(\$file):\$!.);return@ if(\$ENV(REQUEST METHOD)eqGET)(@pairs=split(//,\$ENV(QUERY STRING)))elsif(\$ENV(REQUE ONTENT LENGTH));@pairs=split(//,\$buffer))else(Error(BadorUnknownRequestMethod,Theformsreque