



UNIVERSITI PUTRA MALAYSIA

**BACKUS-NAUR FORM BASED SCRIPT DEFINITION LANGUAGE
FOR MULTIMEDIA PRESENTATION DOCUMENT**

MAYA SILVI LYDIA

FSKTM 2001 4

**BACKUS-NAUR FORM BASED SCRIPT DEFINITION LANGUAGE FOR
MULTIMEDIA PRESENTATION DOCUMENT**

By

MAYA SILVI LYDIA

**Thesis Submitted in Fulfilment of the Requirement for the Degree of Master of
Science in Faculty of Computer Science and Information Technology
Universiti Putra Malaysia**

August 2001



DEDICATION

Dedicated especially to:

Papa and Mama...

Thank you so much for the encouragement, love, and patience, and pray that enable me to finish this thesis.

Thanks to Kak Dewi, Bang Taufik, my cute niece and nephew Dita and Ariq, my sister Dhona and brother Yudi...for their support and good time we spent together.

I Love You All

Abstract of thesis presented to the Senate of Universiti Putra Malaysia on fulfilment of the requirement for the degree of Master of Science

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Chairman: Assoc. Prof. Dr Md Yazid Mohd Saman

Faculty: Computer Science and Information Technology

The integration of the text, graphic, audio, video and animation on the desktop promises to fundamentally challenge the old models of the printed document as the basis for information exchange. A multimedia document is a specification activity that can be used to coordinate the presentation runtime of the media objects. Several language that support the multimedia document exist today, for example HTML (HyperText Markup Language) and SMIL (Synchronized Multimedia Interaction Language). HTML is an SGML (Standard Generalized Markup Language) based standard document model that defines syntax to enrich text pages with structural and layout information. The dynamic modification to structure, layout and content of an HTML document are allowed using a



scripting language which is known as DHTML (Dynamic HyperText Markup Language). SMIL is the web format for multimedia document, which is based on XML (eXtensible Markup Language).

Driven by the use of the text markup tags in the multimedia document, the Script Definition Language or simply SDL is developed. The SDL is a definition language for multimedia document that provides a specification to include multimedia elements, such as text, image, animation, audio, and video. The structure of the SDL is described using the Extended Backus-Naur Form (EBNF). In the EBNF, one way to determine the semantic of the language is achieved by derivation. The standard method to derive the semantic of the language in EBNF is using a parse tree.

The multimedia document proposed is called the script document. There is a browser called the Script Multimedia Presentation (SMP) system, which is developed to generate the presentation output. The browser system scans the input file and produces error messages if it does not fulfil the specification. Each of the input documents derives a parse tree to show that the syntax follows the specification. Only the valid input document derives a valid parse tree and produces output. This can be concluded that the input document should strictly follow the SDL specification in order to generate the multimedia presentation.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**BAHASA DEFINISI SKRIP UNTUK DOKUMEN PERSEMBAHAN
MULTIMEDIA BERASASKAN BENTUK BACKUS-NAUR**

Oleh

MAYA SILVI LYDIA

Ogos 2001

Pengerusi : Prof. Madya. Dr. Md Yazid Mohd Saman

Fakulti : Sains Komputer dan Teknologi Maklumat

Pengintegrasian teks, imej, audio, video dan animasi dalam komputer meja menjanjikan cabaran kepada model dokumen bercetak yang lama sebagai asas dalam pertukaran maklumat. Dokumen multimedia ialah satu aktiviti penspesifikasian yang digunakan untuk menyelaraskan masa pelaksanaan persembahan objek-objek media. Beberapa bahasa yang menyokong dokumen multimedia yang sedia ada hari ini sebagai contoh iaitu HTML (*HyperText Markup Language*) dan SMIL (*Synchronized Multimedia Interaction Language*). HTML ialah model dokumen piawai berasaskan SGML (*Standard Generalized Markup Language*) yang menerangkan sintaks untuk memperkaya halaman teks dengan maklumat mengenai kedudukan dan struktur.

Pengubahsuaian secara dinamik kepada struktur, kedudukan dan kandungan sesebuah dokumen HTML adalah dibenarkan dengan menggunakan bahasa penskriptan yang dikenal sebagai DHTML (*Dynamic HyperText Markup Language*). SMIL adalah untuk dokumen multimedia yang mempunyai format *web* berasaskan XML (*eXtensible Markup Language*).

Diilhami penggunaan teks tandaan *markup* dalam dokumen multimedia, *Script Definition Language* atau SDL dibangunkan. SDL ialah satu bahasa definisi bagi dokumen multimedia yang menyediakan spesifikasi untuk memasukkan elemen-elemen multimedia seperti teks, imej, animasi, audio, dan video. Struktur SDL ditakrifkan menggunakan Bentuk *Backus-Naur* Lanjutan (EBNF). Satu cara untuk menentukan semantik bahasa dalam EBNF adalah melalui penurunan. Kaedah piawai dalam menurunkan semantik bahasa dalam EBNF adalah menggunakan pokok huraian.

Dokumen multimedia yang dicadangkan disebut sebagai dokumen skrip. Satu pelayar yang disebut sebagai sistem Persembahan Multimedia Skrip (SMP) dibangunkan untuk menjanakan output persembahan. Sistem pelayar tersebut akan mengimbas fail input dan mengeluarkan mesej kesalahan apabila ia tidak memenuhi spesifikasi. Setiap dokumen input akan menjanakan sebuah pokok huraian untuk menunjukkan sama ada sintaknya mengikuti spesifikasi ataupun tidak. Hanya dokumen input yang sah sahaja yang boleh menjanakan pokok huraian dan menghasilkan output. Ini boleh disimpulkan bahawa dokumen input haruslah mengikuti spesifikasi SDL supaya boleh menghasilkan persembahan multimedia.

ACKNOWLEDGEMENTS

Praise to the Almighty ALLAH S.W.T. for giving me strength, patience and motivation to complete this work.

My deepest appreciation and sincere gratitude go to Associate Prof. Dr. Md Yazid Mohd Saman, the chairman of my supervisory committee, for providing me inspiration for this work, his valuable guidance, ideas, and for his constructive suggestions during the study. I'm grateful to Dr. Ramlan Mahmud and Dr. Hjh Fatimah Dato' Ahmad, members of the supervisory committee for their full commitment, encouragement and stimulating suggestions that enable me to accomplish the work.

Special thanks to IRPA project for granting me the Graduate Research Assistant fellowship scheme which funding during the earlier of my study.

I would like to extend my thankful to all my colleagues and friends especially Dr. Rozita Johari and Ummu Salmah who allow me to use their place during my study. My fellow friends in the Postgraduate lab especially Kak Yati, Kak Liza ,Umi, Gee, Soon, Mas and Kak Sil for their support. A thousand thanks also go to all the staffs and lecturers in the Faculty of Computer Science and Information Technology for their support and kindness to help me during the study.



Special thanks go to Iman for his special attention, encouragement and help during the time of completing my work. Also thanks to Bu May, Kak Sari, Riri, Nita and Yuli for their very nice friendship and bittersweet memory we have been through each day in Kolej Mohamad Rashid. I'm also indebted to all my friends in the Indonesian Student Association of UPM for their nice friendship during my study.

My deepest thanks go to Om Zainal Arifin and Tante Yan for their support, advice and generosity to let me stay with them during my study. Finally, my deepest thanks and appreciation go to my father, Ir.Hj.Teuku.Marzuki Yacob, my mother Dra.Hjh. Ulfah, MS, my sisters Kak Dewi and Dhona and brother Yudi for the enormous amount of love, full support and sacrifice that they have given. May ALLAH S.W.T bless all of you. Amin.

I certify that an Examination Committee met on 30th August 2001 to conduct the final examination of Maya Silvi Lydia on her Master of Science thesis entitled “Backus-Naur Form Based Script Definition Language for Multimedia Presentation Document” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the examination committee are as follows:

Hamidah Ibrahim, Ph.D.,
Faculty of Computer Science and Information Technology
Universiti Putra Malaysia
(Chairperson)

Md. Yazid Mohd.Saman, Ph.D.,
Associate Professor
Faculty of Computer Science and Information Technology
Universiti Putra Malaysia
(Member)

Ramlan Mahmud, Ph.D.,
Faculty of Computer Science and Information Technology
Universiti Putra Malaysia
(Member)

Fatimah Dato Ahmad, Ph.D.,
Faculty of Computer Science and Information Technology
Universiti Putra Malaysia
(Member)



MOHD GHAZALI MOHAYIDIN, Ph.D.,
Professor/Deputy Dean of Graduate School,
Universiti Putra Malaysia

Date: 23 OCT 2001

The thesis submitted to the Senate of Universiti Putra Malaysia has been accepted as fulfilment of the requirement for the degree of Master of Science.



AINI IDERIS, Ph.D.,
Professor
Dean of Graduate School,
Universiti Putra Malaysia

Date: 13 SEP 2001

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.



MAYA SILVI LYDIA

Date: 22 OCTOBER 2001

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LIST OF ABBREVIATIONS

2D	2-Dimensional
3D	3-Dimensional
Anigif	Animation Gif
ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
AVI	Audio Video Interleave
BNF	Backus-Naur Form
CCIR	The International Consultative Committee on Broadcasting
CIF	Common Intermediate Format
CSG	Constructive Solid Geometry
CTR	Computer Technology Research
DHTML	Dynamic HyperText Markup Language
DTD	Document Type Declaration
DVI	Digital Video Interaction
EBNF	Extended Backus-Naur Form
GIF	Graphic Interchange Format
GIFCON	Gif Construction
GUI	Graphical User Interface
HDTV	High Definition Television
HTML	HyperText Markup Language
ISDN	Integrated Services Digital Network



ISO	International Organization of Standardization
JPEG	Joint Photographic Experts Group
MCI	Multimedia Control Interface
MIDI	The Musical Instrument Digital Interface
MIPS	Music Information Processing Standards
MPEG	Moving Picture Expert Group
NTSC	National Television Systems Committee
ODA	Office Document Architecture
PAL	Phase Alternation Line
PI	Processing Instruction
PLV	Production Level Video
QCIF	Quarter-CIF
RTV	Real-Time Video
SDL	Script Definition Language
SEGAM	Séquentiel Couleur avec Mémoire
SGML	Standard Generalized Markup Language
SMDL	The Standard Music Description Language
SMIL	Synchronized Multimedia Interaction Language
SMP	Script Multimedia Presentation
VB	Visual Basic
VBP	Visual Basic Project
VR	Virtual Reality
W3C	World Wide Web Consortium

WWW **World Wide Web**

XML **eXtensible Markup Language**

CHAPTER 1

INTRODUCTION

1.0 The Role of Multimedia in Information Presentation

The explosive growth of computer industry, the software system in particular has increased the demand for better software systems. Nowadays, parallel with the development of information technology, the use of computing power, as a means of spreading information to people will increase. However, popular application-development systems today support only the traditional data types common to commercial data processing, text, number and date. All of these are displayed in character forms, either as dot-matrix characters or the traditional cathode ray tube display screen (Harrison, 1995).

In recent years, the term multimedia has become a buzzword and has been used in many contexts. From a user's perspective, multimedia allows computer information to be represented in several data types. They are static 2-dimensional (2D) and 3-dimensional (3D) colour graphics; animated 2D and 3D colour graphics, audio, static images, full motion video, text and fonts.

The integration of these media into computer provides additional possibilities for the use of computational power currently available (for example, for interactive presentation of huge amount of information) (Steinmetz and Nahrstedt, 1997).



Multimedia is a fast emerging basic skill that will be important to life in the twenty-first century (Hofsetter, 1995). In the sales presentation for instance, the use of colour, graphics to show the organization's financial performance will improve the effectiveness of the presentation itself. When used for the purpose of entertainment, the combination of several media, such as sound, graphics, images and animation will be beneficial enough.

In education, the use of 3D animated colour graphics in the presentation of certain parts of the subject will enhance the comprehension of students. Well-designed colour graphics can convey a tremendous amount of information in a very compact, memorable, and visually appealing form. The use of animation to add realism to artificial objects or surrealism to images of real objects will enhance the applications. Well-designed animations will also increase the memorability and retention of the multimedia information they display (Harrison, 1995). Audio is not only increasing the information retention but, also, provides ways to communicate with application users when their eyes are not fixed on their display screen.

The Information Workstation Group (1993), as cited by Hofsetter (1995), forecasts that multimedia will be a \$30 billion dollar industry by 1998: the top three applications will be entertainment (\$9.1 billion), publishing (\$4.7 billion), and education and training (\$4.3 billion). The growth of multimedia systems is also marked by the increase of the production of Multimedia PC's in United States. The selling of the CD-ROM players which was according to the Dataquest, in 1993, as much as 4.8 million CD-ROM,

tripled the sales of the prior year has, strengthened the role of multimedia systems as a powerful media of enhancing information presentation. Computer Technology Research (CTR) 1992 also projects that multimedia computers will grow by a compound average growth rate of 82% to reach 15.5 million systems in 1995 (Hofsetter, 1995).

The way multimedia work to spread information to the people has been highlighted by Shuman (1998) in terms of multimedia presentation and standalone title. In the lecturing process, a lecturer uses a computer to explain his/her subject and show the simulation of certain parts of the subject. It is primarily a one-way linear communication process. This kind of information distribution is called multimedia presentations and involves a presenter and an audience of one or more persons. The presenter has control over the multimedia title. Many presentation packages use the multimedia approach in the market today, for example Harvard Graphics, PowerPoint etc.

On the other hand, stand-alone titles are those intended for use by individuals in one-on-one situations. The control of the presentation belongs to the user and he/she can determine what to view and review based on his/her needs. The primary differences between multimedia presentations and stand-alone titles are control and the amount of the interactivity that is involved (Shuman, 1998).

1.1 Multimedia System

Multimedia promises to improve significantly the processing and retention of information by application users. However, a multimedia object in isolation is not