Visual Basic Research Report

Student Information System (SIS)
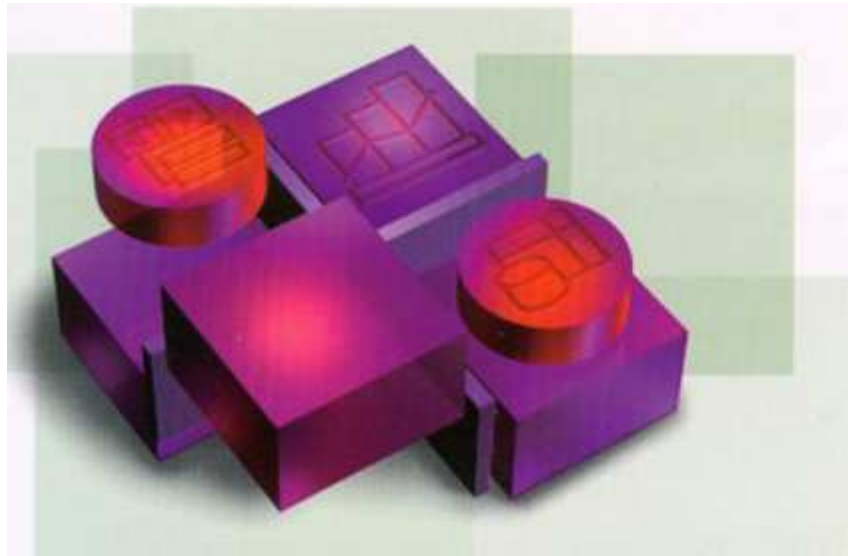
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1. History

VB 1.0 was introduced in 1991. The drag and drop design for creating the user interface is derived from a prototype form generator developed by Alan Cooper and his company called Tripod. Microsoft contracted with Cooper and his associates to develop Tripod into a programmable form system for Windows 3.0, under the code name Ruby (no relation to the Ruby programming language). Tripod did not include a programming language at all. Microsoft decided to combine Ruby with the Basic language to create Visual Basic.

The Ruby interface generator provided the "visual" part of Visual Basic and this was combined with the "EB" Embedded BASIC engine designed for Microsoft's abandoned "Omega" database system. Ruby also provided the ability to load dynamic link libraries containing additional controls, which later became the VBX interface

2. Introduction

The purpose of this report is to identify how Visual Basic might play a part as a component of a new information system to be used in A for recording and maintaining student profiles.
Visual Basic (VB) is the event-driven third-generation programming language and integrated development environment (IDE) from Microsoft for its COM programming model. Due to its BASIC heritage and graphical development features, VB is also considered a comparatively easy to use and learn programming language. Visual Basic enables the rapid application development (RAD) of graphical user interface (GUI) applications and was derived from BASIC. It provides the facility to access databases using Remote Data Objects, ActiveX Data Objects or Data Access Objects, and formation of ActiveX controls and objects.

Scripting languages like VBA and VBScript are similar syntactically to Visual Basic; however perform in a different way. Visual Basic Programs can also use the Windows API, but requires external function declarations for that. In March 2008, Microsoft's extended support ended and the designated successor was Visual Basic .NET popularly known as Visual Basic simply.

3. What is visual basic?

Visual Basic is a development system that is used for creating applications based on an object-oriented programming that run under any of the Microsoft Windows environments.

(2010. Visual Basic. Webopedia).

4. Why use Visual Basic?

Visual Basic is essential programming. Without knowing Visual Basic it's hard to comprehend the other languages. Although it is used to train programmers, it is not used to create too many programs.

5. Importance of Visual Basic

Visual Basic was designed to be easy to learn and use, like the BASIC programming language. Programmers not only create simple GUI applications, but can also build-up complex applications through this language. Programming in Visual Basic is a mixture of visually arranging controls or components on a form, specifying actions and attributes of those components, and writing further lines of code for more functionality. Since for the components default actions and attributes are defined, without the programmer a simple program can be created instead of writing many lines of code.

(2010. What is the importance of Visual Basic? Wikianswers).

6. Components of Visual Basic

Following are its two major components:

6.1. Controls: they are extensive collection of prewritten tools. Within a graphical programming environment these controls are accessible as icons for making customized windows components r example text boxes, slide bars, menus, dialog boxes, etc.

6.2. Commands: A full group of program commands, derived from Microsoft's execution of the classical Basic programming language. The command group contains characteristics that squeeze modern programming practices.

(Byron S. Gottfried. Theory And Problems Of Programming With Visual Basic).

7. Features of Visual Basic

Following are some of the features of Visual Basic:

- ➢ Full set of objects
- ➢ ActiveX support
- ➢ Lots of icons and pictures
- ➢ Response to mouse and keyboard actions
- ➢ Clipboard and printer access
- ➢ Full array of mathematical, string handling, and graphics functions
- ➢ Can handle fixed and dynamic variable and control arrays
- ➢ Sequential and random access file support
- ➢ Useful debugger and error-handling facilities
- ➢ Powerful database access tools
- ➢ Package & Deployment Wizard makes distributing your applications simple
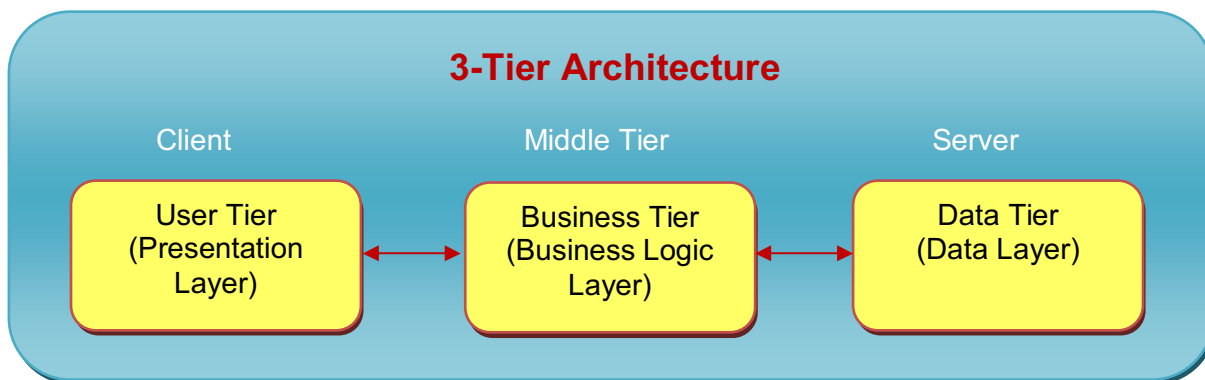
7.1 Enhanced Features

- ➢ Faster compiler
- ➢ New ActiveX data control object
- ➢ Allows database integration with wide variety of applications
- ➢ New data report designer
- ➢ New Package & Deployment Wizard
- ➢ Additional internet capabilities

(2010. Visual Basic. Database Access and Management. KIDware).

8. Visual Basic and 3-Tier Architecture for SIS

The implementation, where the user interface, business rules and data services are designed to run as three separate tiers, is known as a 3-tier application. The tiers will be separated so that the application can be run on three different computers. The next logical step is to separate the tiers so that the application can be run on three separate computers (all 3 tiers can also be run on a single machine).

(1999-2010.Visual Basic 6 Application Development. Developerfusion).

3-Tier Architecture

Client   Middle Tier   Server

User Tier (Presentation Layer)	↔	Business Tier (Business Logic Layer)	↔	Data Tier (Data Layer)

In student information system 3-tier architecture will be used with VB as a backend technology. This 3-tier architecture will comprise of the three layers on which different tasks will be accomplished as given below:

8.1. Presentation Layer

This tier presents the user interface (UI) for the application, displays data and collects user input. This tier also sends requests for data to the next tier. This tier is often known as the presentation layer.
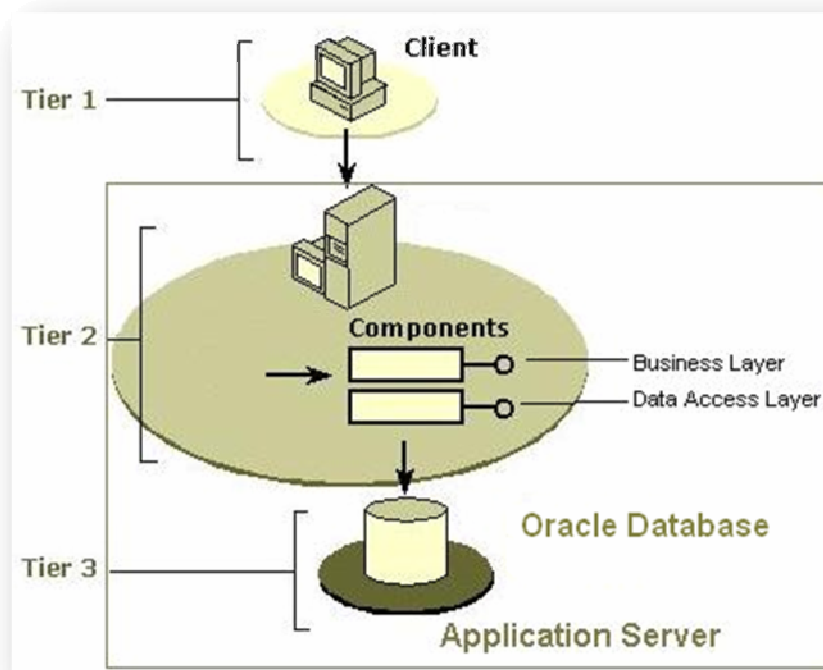
8.2. Business Logic Layer

This tier incorporates the business rules for the application. This middle tier receives requests for data from the user tier, evaluates them against the business rules and passes them on to the data

tier. It then receives data from the data tier and passes this back to the user tier. This tier is also known as the business logic layer.

8.3. Data Layer

This tier communicates directly with the data store (SQL Server database, other type of database such as Oracle, Exchange data store, Excel workbook, etc.) and passes data between the data store and the business tier. This tier is also known as the data layer.

Software Architecture of Visual Basic

9. Features of Student Information System (SIS) for UCL basis.

Following features of SIS will be handled in VB with correspondence to 3-tier architecture:

- ➤ Handling academic & financial inquiries from prospective UCL students
- ➤ Handling the admissions process (such as UCAS)
- ➤ Enrolling new UCL students and storing teaching option choices
- ➤ Automatically creating class & teacher schedules

➢ Handling records of examinations, assessments, marks and grades and academic progression

➢ Maintaining records of absences and attendance

➢ Maintaining discipline records

➢ Providing statistical reports

➢ Maintenance boarding house details

➢ Accounting and budgeting services

➢ Student health records

➢ Student emergency details

➢ Student courses details

➢ Student profiles management

➢ Students administrative records management

10. Using Visual Basic Script for SIS

In order to make a webpage to make possible for students to access to the source their status, it is necessary to use Visual Basic Script (VBS). VBS is the part of VB family, which includes the Microsoft VB (Visual Basic) Development System and VB for Applications. Mostly VBS is a division of the VB for applications programming language. Developers of Microsoft developed this programming language in order for VB developers to influence their awareness of VB and VBA in Internet scripting. It is a technique that applies in Hyper Text Markup Language (HTML). VBS uses relatively easy syntax thus it is very easy to learn for those who have some basic knowledge about VB, even for the people who don't know anything about programming languages. Therefore it allows people for easier approaches to programming analysis and making it than general programming languages (Java, C language). In addition, it is also easy to change existing programs so it embraces the security problems. Consequently, if College uses this programming language to run academic and administrative records, it has a possibility to get attacked by hackers. In results, there might be a serious exposure of personal information as well as administrative documents.

(2003, VBScript in a Nutshell second edition,O'reilly)

11. Pros of Visual Basic

For the enormous success of VB (Visual Basic) there are quite several reasons as given below:

• Easily integrated with large Oracle databases

- Easy to use almost in all aspects as compared to other programming languages (easy programming language particularly as to the executable code, the structure of the Basic programming language is very easy)

- Less programming is required as compared to other technologies

- VB requires less CPU processing

- Provide attractive views

- Support RAD applications

- Simple and easy to use by the university staff

- Powerful front-end tool

- Multiple vendor support

- VB is not only a language but primarily an integrated, interactive development environment ("IDE").

- To support rapid application development ("RAD"), the VB-IDE has been highly optimized.

- VB-IDE's graphical user interface provides instinctively attractive views for the management of the program structure.

- VB provides a context-sensitive and comprehensive interactive online help system.

- VB is a component integration language which is attuned to Microsoft's Component Object Model ("COM").

- COM components can be integrated using VB.

- Via Distributed COM ("DCOM") Interfaces of COM components can be simply called remotely, which makes it simple to create distributed applications.

(Advantages of Visual Basic).

12. Cons of Visual Basic

The issues related to visual basic are discussed as follows:

> Versioning problems associated with various runtime DLLs, known as DLL hell

> Poor support for object-oriented programming

- Inability to create multi-threaded applications, without resorting to Windows API calls
- Inability to create Windows services
- Variant types have a greater performance and storage overhead than strongly typed programming languages
- Dependency on complex and fragile COM Registry entries
- The development environment is no longer supported by Microsoft
- Memory leakage due to enormous amount of objects which VB conducts
- Needs some other applications to create web application
- Slow performance, thus it is troublesome to update information

(17 October 2010. Visual Basic From Wikipedia, the free encyclopedia).

13. Conclusion

Visual Basic is engineered for productively building type-safe and object-oriented applications. Visual Basic enables developers to target Windows, Web, and mobile devices. The Visual Basic approach has become the norm for programming languages. Now there are visual environments for many programming languages. Visual Basic is sometimes called a Rapid Application Development (RAD) system because it enables programmers to quickly build prototype applications.

Since Visual Basic and other programming languages are always changing and evolving. The modern Visual Basic.NET framework added many new applications and tools to the programming language. Visual Basic is a flexible and popular language that is used to develop graphical user interfaces. With some understanding of technology and programming, it's relatively easy to learn Visual Basic.

Visual Basic plays a crucial role in the deployment of the student information system (SIS) due to its advance features and integrated development environment (IDE). VB can easily be

integrated with large databases like Oracle and easy to use as compared to other technologies in this competitive era of revolution.

However, Visual Basic suffers from versioning problem with various runtime such as DDLs. The creator of Visual Basic, Microsoft has stopped supporting the development of Visual Basic therefore it has a difficulty of catching up the advancing technology in the future. To create a webpage for students to be aware of their current status, it needs to be done with such a program called 'Visual Basic Script'. However this has security issues and slow performance to update any information so it is not recommended for the college to use it.

14. Recommendations

The recommended technology for student information system (SIS) is VB.Net. It's an advance version of Visual Basic and integrated development environment (IDE) from Microsoft for its COM programming model.

Following are some of the reasons of using Vb.net over visual basic:

- ➢ VB.NET provides managed code execution that runs under the Common Language Runtime (CLR), resulting in robust, stable and secure applications which are needed for keeping student academic and administrative records. All features of the .NET framework are readily available in VB.NET.

- ➢ VB.NET is totally object-oriented. This is a major addition that VB6 and other earlier releases didn't have.

- ➢ The .NET framework comes with ADO.NET, which follows the disconnected paradigm, i.e. once the required records are fetched the connection no longer exists. It also retrieves the records that are expected to be accessed in the immediate future. This enhances Scalability of the application to a great extent.

- ➢ VB.NET uses XML to transfer data between the various layers in the DNA Architecture i.e. data are passed as simple text strings.

- ➢ Error handling has changed in VB.NET. A new Try-Catch-Finally block has been introduced to handle errors and exceptions as a unit, allowing appropriate action to be taken at the place the error occurred thus discouraging the use of ON ERROR GOTO statement. This again credits to the maintainability of the code.

➢ Another great feature added to VB.NET is free threading against the VB single-threaded apartment feature. In many situations developers need spawning of a new thread to run as a background process and increase the usability of the application. VB.NET allows developers to spawn threads wherever they feel like, hence giving freedom and better control on the application.

➢ Security has become more robust in VB.NET. In addition to the role-based security in VB6, VB.NET comes with a new security model, Code Access security. This security controls on what the code can access. This type of security is important because it allows building components that can be trusted to various degrees.

➢ The CLR takes care of garbage collection i.e. the CLR releases resources as soon as an object is no more in use. This relieves the developer from thinking of ways to manage memory. CLR does this for them.

(2008. VB.NET).

Glossary

COM: Component Object Model

CLR: Common Language Runtime

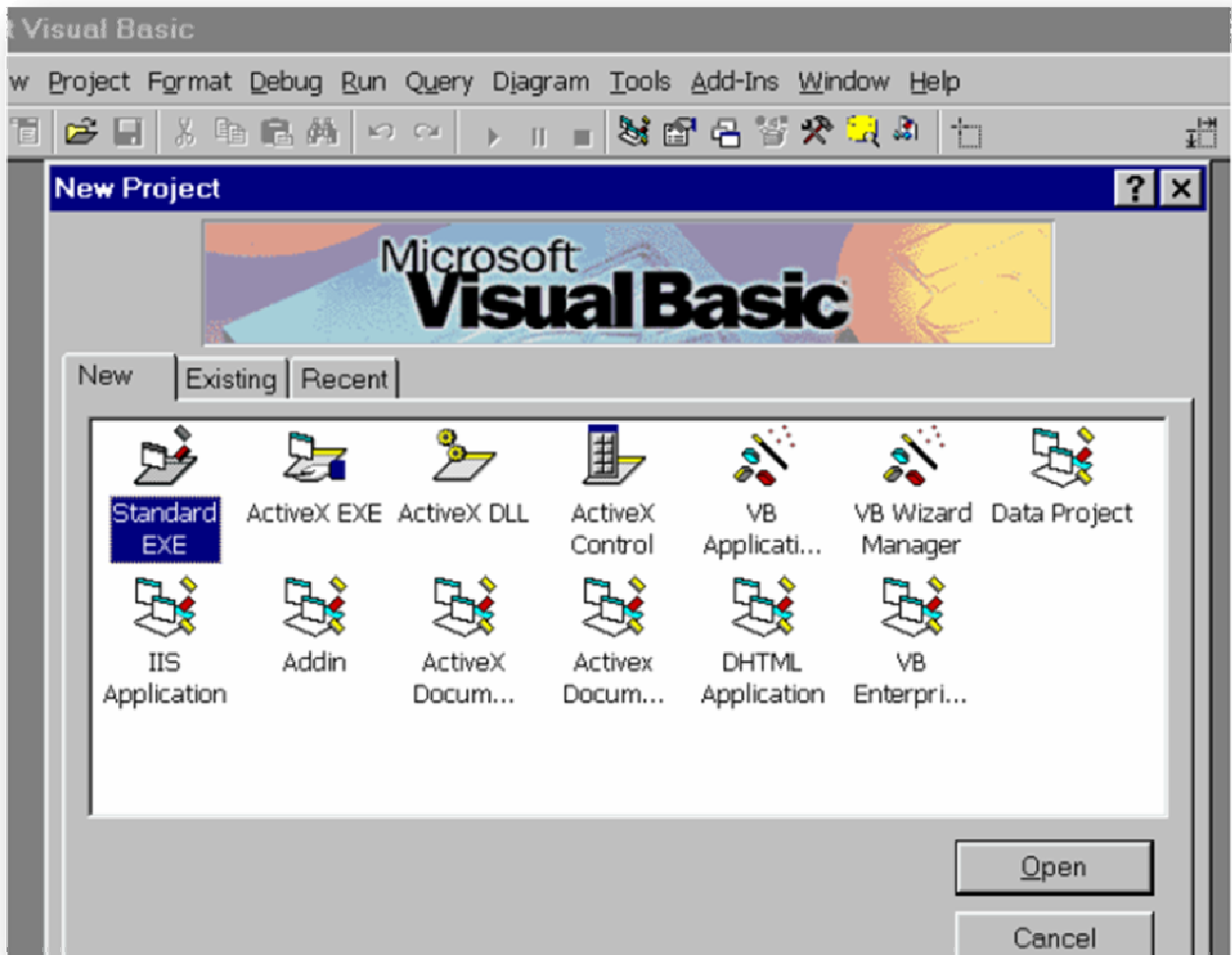**GUI:** Graphical user interface

IDE: Integrated development environment

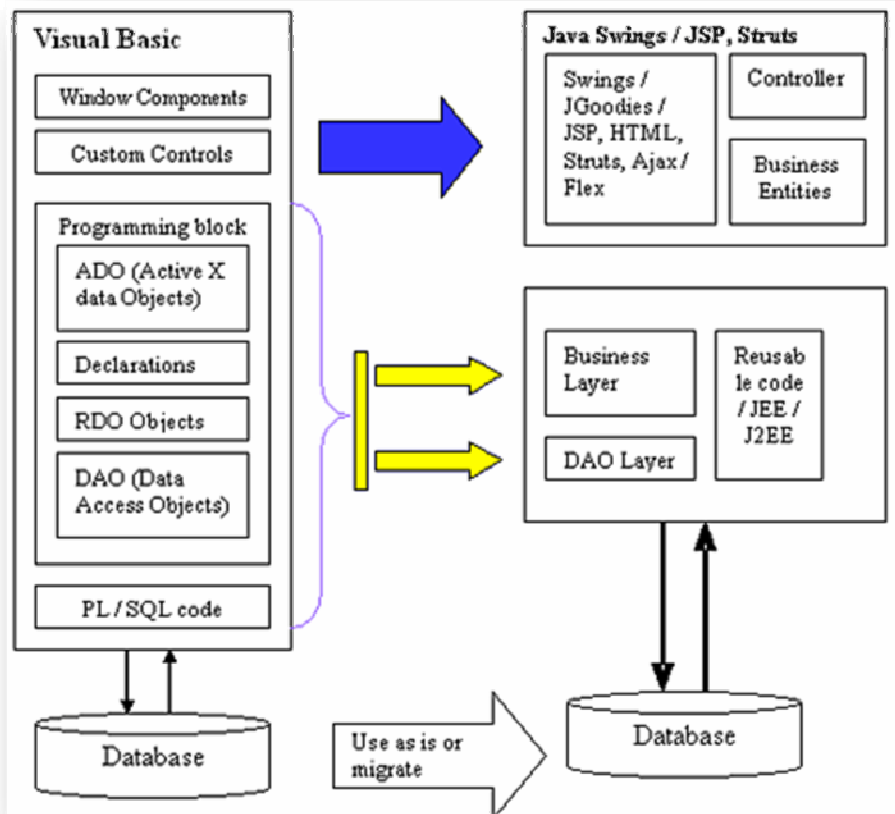**RAD:** Rapid application development

SIS: Student Information System
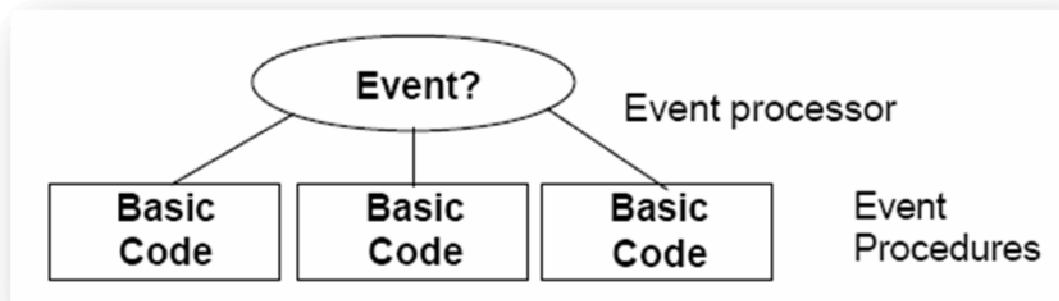
Appendix

Microsoft Visual Basic
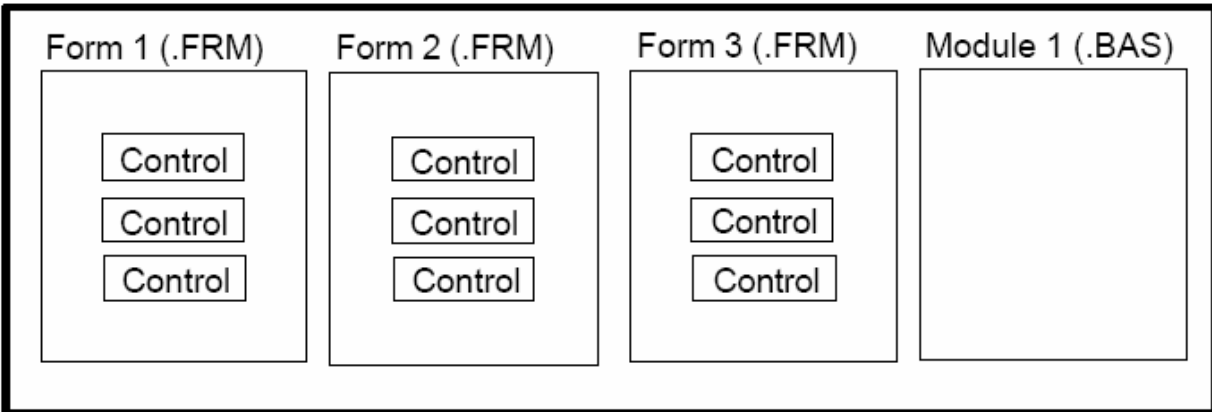
Visual Basic Architecture

Event Driven Approach

Visual Basic is event-driven, meaning code remains idle until called upon to respond to some event (button pressing, menu selection). Visual Basic is governed by an event processor. Nothing happens until an event is detected. Once an event is detected, the code corresponding to that event (event procedure) is executed. Program control is then returned to the event processor.

Structure of a Visual Basic Application

Project (.VBP, .MAK)

Form 1 (.FRM)	Form 2 (.FRM)	Form 3 (.FRM)	Module 1 (.BAS)
Control	Control	Control	
Control	Control	Control	
Control	Control	Control	

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