Map Online

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Zagazig University
Faculty of Computers and Informatics

Prof.Dr.Ehab Rushdy
Prof.Dr.Osama El Komy

ABOUT THE WORKGROUP

Students in 4th Year of Information Technology Department

Faculty of Computers and Informatics

Zagazig University

Project Team :

Heba Allah Mohammed Ali

Nesma Alaa El-Deen Selim

Islam Mohsen Hassan

Noha Abd El-Karim Zaki

Nihal Salah Attia Radwan

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ABSTRACT

Most people are still use traditional techniques in their life to find the shortest path between two cities ,

But this technique waste time , fuel consuming and require effort in calculation to determine the shortest route to destination .

our project helps users to find the shortest path and the same time save time and consume less fuel and effort that wasted during using traditional technique .

our project also helps user to know the distance and time spent to arrive to the desired destination .

our project depend on dijkstra's algorithm to calculate the shortest path to the a desired destination .

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ONE

INTRODUCTION

1.1 My Map Online

In our project we concentrate on finding driving directions and computing best route based on shortest path leeds to the destination .

1.1.1 What is Map Online ?

Is an web application that calculates the shortest path to the desired destination

DISTANCE AND TIME SPENT

TURN-BY-TURN SHORTEST DRIVEN DIRECTION

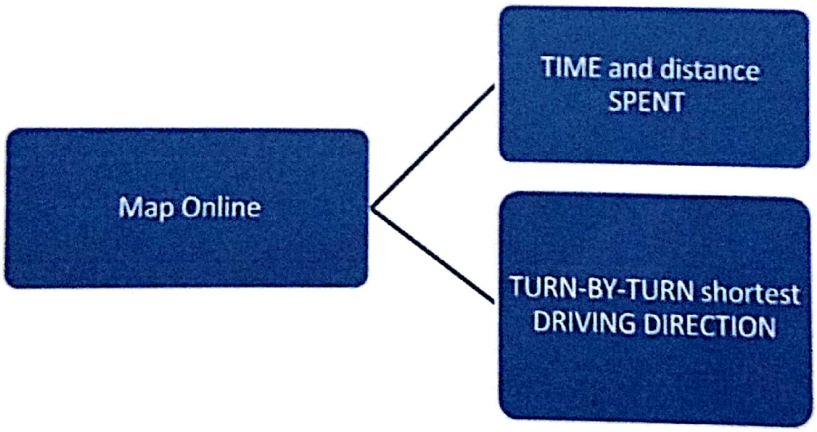

Figure 1.1 objectives of the project

- **DISTANCE AND TIME SPENT**

  Calculate the distance between two cities and time spent to reach the desired destination .

  For example :- If you need to travel from zagazig to Ismailia pathing through Abo hammad , El-Qasasin and Abo sower .

  The total distance 80.2 km and **time spent** is 82minutes .

- **TURN-BY-TURN SHORTEST DRIVING DIRECTION**

  Gives you the shortest path to the desired destination.

  For example:- If you need to travel from zagazig to cairo

  There are multiple routes leeds to cairo :-

  First:-Zagazig,Minia El-kmh, Banha,Qalub,Cairo.

  Total Distance is 82.9km & **Time spent** is 1 hour 24 minutes

  Second:-Zagazig,Belbes,El-salam,Cairo

  Total Distance is 81.6km & **Time spent** is 1 hour 24 minutes

  Third:-Zagazig,Abo hammad,El-Qasain,Abo sower,Ismailia,El-asher, El-salam,Cairo

  Total Distance is 81.1km & **Time spent** is 1 hour 25 minutes

You need to know which the best route ??

The application find the best route with lowest distance .

In our example:- The best route is third route

1.2 Problem Definition:-

- Do you map multiple addresses each day ?
- Do you spend hours mapping your routes ?
- Do you want to save time, fuel and money ?

1.2.1 Disadvantages traditional technique:-

- Time consuming.
- Money consuming
- Fuel consuming

1.3 Problem Solving:-

We can solve problems of traditional technique by:

Converting traditional technique into computer system by using electronic map, our project aims to do this. So all things can connect to the computer without need to the the large calculation.

1.3.1 Advantages of map online:-

- Save time and effort that wasted in doing routine operations.
- Saving fuel.
- Less money cosuming .
- Finding the direction and shortest route easily
- Increase performance in finding the shortest route.
- Make work less tedious.
- minimize errors in finding the direction and shortest route to destination.

1.4 History of maps

Maps have an exciting history of their own. Over time, they evolved from being rough sketches, often based on travellers' tales and stories passed on through word of mouth that may or may not have been true.Nowadays maps are accurate scientific instruments Their development runs in parallel with the development of civilisation.

1.4.1 Early Maps

Early attempts at creating maps were extremely limited by a lack of knowledge of areas other than very local surroundings of the map maker`s.

The earliest known maps are from Babylon (in modern Iraq), where they were produced on clay tablets. These date from about 2500 BC.

The Turin Papyrus is an Ancient Egyptian map. it dates from around 1200 BC. It was created for Ramses IV, an Egyptian king.

Like the kings who had gone before him, Ramses IV had ambitious plans to build great temples and statues.

The map was created as a guide to the area where the huge stones used to build the temples and statues were quarried. Click on the image to get a closer look.

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1.4.2 Ptolemy's Map Creations

Ptolemy's work was lost to the West until the Renaissance when his writings, rather than his maps, survived. People who constructed maps in the fifteenth and sixteenth centuries recreated the maps of Ptolemy by following the notes and writings in his books. Look at the map below from 1503 which was based on Ptolemy's writings.

1.4.3 Medieval Maps

Between 500 and 1100 AD, or the Early Middle Ages, Europe descended into the Dark Ages. During this time the Arabs led the mapping world in terms of accuracy and detail. See the image below to take a closer look at a Moroccan map from 1154.

During the middle ages, or medieval period, it was traditional to draw maps with a religious perspective - Jerusalem was often shown as the centre of the world. As

the Vikings explored in the Atlantic, discovering Iceland, Greenland and America, some of their discoveries were incorporated.

1.4.4 Mercator's Projection

Gerardus Mercator (1512-1594), the famous Flemish cartographer, created the first effective way of showing the world as a sphere on a flat surface in the mid-16th century. This was known as the Mercator projection. His world map of 1569 was the best to date. He produced an atlas in 1578 and this was regulary updated to include new information in later issues. We still use The Mercator projection today.
Mecator is famous for what is called his projection. He devised a way of making globes of the Earth. Until then there was no way of showing a map of the world other than on a flat sheet of paper. He knew that the Earth was a sphere - but how would you show that using a map? Have you ever tried to wrap up a football? That is what it would be like trying to wrap a map of the world around a sphere. The ends would be all wrinkled and information would be lost.

He made the globes from papier-mache spheres, coated in thin plaster. Next he divided the map of the world into 12 different pieces, like segments of an orange that were narrow and each end near the North & South Poles and wider in the middle. He then put all the pieces together (like a 3D Jigsaw) and stuck them in the correct places on the globe.

1.4.5 18th & 19th Century Maps

Maps became increasingly accurate in the 18th, 19th and 20th centuries. As the European powers became stronger in the Americas, Africa and Asia, maps were essential for managing the new empires. The first and second world wars required detailed, accurate maps on a scale never before created.

1.4.6 Aerial Photography

Aerial photography is the taking of photographs from the air. The French photographer and balloonist Gaspar Felix Tournachon, also known as "Nadar" was the first individual known to have taken an aerial photograph in 1858. The practice of aerial photography expanded during World War 1 where they were used when planning attacks and defenses. It is widely used in cartography today due to the wealth of information it provides.

1.4.7 Satellite Maps

Satellite technology has revolutionised the map-making process and has taken the field of aerial photography to new 'heights'.

The year of 1957 saw the beginning of satellite imagery with the launch of the Russian satellite, Sputnik. With the launch of the Landsat satellites by NASA in 1972, satellite imagery began to be sold commercially.

Nowadays satellites can take very detailed digital images of the earth's surface from over 650 kilometres away. They can identify objects on the earth as small as one square metre and circle the earth fourteen times a day.

1.4.8 Google Maps

An exciting recent development in mapping is the availability of detailed maps on the Internet.

Google Maps is an excellent example. This program allows you to select a country and zoom in and get very detailed maps, often down to small street level. While coverage of Ireland is not as good as it might be, it is improving all the time.

A sister product, Google Earth, provides a way to zoom in on particular parts of Ireland, using a huge database of satellite images. Depending on the level of coverage available for a particular location, you can often see your own town, village or even house !

Map-making has come a long way.

chapter

Two

Information System Concepts and System Development Life Cycle

2.1 OVERVIEW[3]

This chapter provides different concepts and definitions of information technology development.

System analysis and design methods are applied by system analysts to facilitate the development of information technology and computer applications.

►► *What is an Information technology?*

- An Information technology (IT) is a technology which uses computers to gather, process, store, protect, and transfer information. Today, it is common to use the term Information and communications technology (ICT) because it is unimaginable to work on a computer which is not connected to the network.

►►What is a Computer Application System?

- A **computer application** is computer-based solution to one or more business problems and needs. One or more computer applications are typically contained within an information system.
- One specialist plays a special role in systems and applications development, the systems analyst.
- A **systems analyst(s)** facilitates the:-
  Development of information technology and computer applications. By facilitating the study of business problems and needs to determine how the business system and information technology can solve the problem and accomplish improvements for the business well.

- The systems analyst performs **systems analysis and design.**
  - **Systems analysis** is the study of a business problem domain for the purpose of recommending improvements and specifying the business requirements for the solution.
  - **Systems design** is the specification or construction of a technical, computer-based solution for the business requirements identified in a systems analysis. (Note: Increasingly, the design takes the form of a working prototype.)

- **Most systems analysts use some variation of a system problem solving approach called a system development life cycle.**

  - **A *systems development life cycle* (SDLC) is a systematic and orderly approach to solve system problems.**

- **The SDLC usually incorporates the following general-purpose problem solving steps:**

  - ***Planning*:-** identify the scope and boundary of the problem, and plan the development strategy and goals.

  - ***Analysis*: -** study and analyze the problems, causes, and effects. Then, identify and analyze the requirements that must be fulfilled by *any* successful solution.

  - ***Design*: -** if necessary, design the solution not all solutions require design.

  - ***Implementation*: -** implement the solution.

  - ***Support*: -** analyze the implemented solution, refine the design, and implement improvements to the solution. Different support situations can thread back into the previous steps.

►►Modern Business Trends and Implications for the System Analyst:-

System analysts are being significantly influenced and affected by several business trends such as Business process redesign and Continuous process improvement

- **Business process redesign (BPR)** is the study, analysis, and redesign of fundamental business processes to reduce costs and improve value added to the business.
- **Continuous process improvement (CPI)** is the continuous monitoring of business processes to affect small but measurable improvements to cost reduction and value added.

►►A review fundamental of information systems:-

Most experts agree on the fundamental difference between data and information.

- **Data** are raw facts about the organization and its business transactions. Most data items have little meaning and use by themselves.

- **Information** is data that has been refined and organized by processing and human intelligence.

2.2 Information System Development CONCEPTS[4]

This section introduces a system development life cycle-based methodology as the process used to develop information systems.

2.2.1 System Development Life Cycles and Methodologies

- The process used to develop information systems is calleda *methodology.*
- All methodologies are derived from a logical system problem-solving process that is sometimes called a *system development life cycle.*

- **A system development life cycle (SDLC):-**
  Is a logical process by which systems analysts, software engineers, programmers, and end-users build information systems and

- Computer applications to solve business problems and needs. It is sometimes called an application development life cycle.

- **Amethodology** :
  Is the physical implementation of the logical life cycle that incorporates (1) step-by-step activities for each phase, (2) individual and group roles to be played in each activity, (3) deliverables and quality standards for each activity, and (4) tools and techniques to be used for each activity?

  - A true methodology should encompass the entire system's development life cycle.
  - Most modern methodologies incorporate the use of several development tools and techniques.
  - Methodologies ensure that a consistent, reproducible approach is applied to all projects.
  - Methodologies reduce the risk associated with shortcuts and mistakes.
  - Methodologies produce complete and consistent documentation from one project to the next.

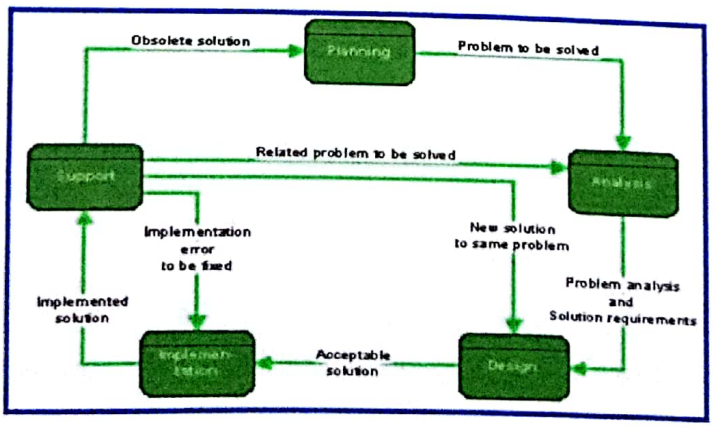

Figure 2.1A System Development Life Cycle.

2.2.2 Underlying Principles of Systems Development

There are some general principal that should underlie all systems development methodologies.

- Get the Owners and Users Involved
- Use a Problem-Solving Approach
- Establish Phases and Activities
- Establish Standards for Consistent Development and Documentation
- Justify Systems as Capital Investments
- Don't Be Afraid to Cancel or Revise Scope
- Divide and Conquer
- Design Systems for Growth and Change

2.2.3 Cross Life Cycle Activities[5]

- **Cross life cycle activities** are activities that overlap many or all phases of the methodology, in fact; they are normally performed in conjunction with several phases of the methodology.

- Cross life cycle activities include:

  - Fact Finding
  - Documentation and Presentation
  - Estimation and Measurement
  - Feasibility Analysis
  - Project Management
  - Process Management.

►►Fact Finding:-

- **Fact finding** – also called information gathering or data collection is the formal process of using research, interviews, meetings, questionnaires, sampling, and other techniques to collect information about systems, requirements, and preferences.

►►Documentation and Presentation:-

- Two forms of communication that are common to systems development projects are documentation and presentation.

- **Documentation** is the activity of recording facts and specifications for a system.
- **Presentation** is the related activity of formally packaging documentation for review by interested users and managers. Presentations may be either written or verbal.

►► Estimation and Measurement:-

- Information systems are significant capital investments. For this reason, estimation and measurement activities are commonly performed to address the quality and productivity of systems.

- **Estimation** is the activity of approximating the time, effort, costs, and benefits of developing systems. The term estimation (as in "make a guess") is used to describe the same activity in the absence of reliable data.
- **Measurement** is the activity of measuring and analyzing developer productivity and quality (and sometimes costs).

►►Feasibility Analysis:-

- **Feasibility** is a measure of how beneficial the development of an information system would be to an organization.
- **Feasibility analysis** is the activity by which feasibility is measured.

►►Project Management and Process Management:-

- Systems development projects may involve a team of analysts, programmers, users, and other IS professionals who work together.

- ***Project management*** is the ongoing activity by which an analyst plans, delegates, directs, and controls progress to develop an acceptable system within the allotted time and budget.
- ***Process management's*** intent is to standardize both the way we approach projects, and the deliverables we produce during projects.
- ***Process management*** is an ongoing activity that establishes standards for activities, methods, tools, and deliverables of the life cycle.

2.3 Basic components Of Information System CONCEPTS[6]

Every system can be considered a black box, which has input, process, files and output. The basic difference between a business system and any other is that the majority of the business system outputs are in the form of information (formatted data) printed in reports, invoices, screens, and so on, while most other systems' outputs are not printed information

➢ Data input:-

Data input to a computer must be structured (organized) so that they can be accepted by the computer data are normally grouped in to sets or chains called records.

Each record has a primary key (i.e., the data element or elements that identify it).

➢ Data stored:-

Data can be stored in a variety of ways and in a variety of structures. From the user's viewpoint the data are either in *random access storage* such as disk files or in *batch storage* such as tape files. Records in a file can be *independent* or *dependent* on one another in a hierarchy or a network.

➢ Output data:-

Output data are that are read by people. As such, they must be presented to the reader in a format and structure that he can use. Any output record may have the same structure as a record in the file, be part of a file record, or could result from data combined from two or more records in the file.

➢ File maintenance:

File maintenance is the processing of input data to update the data stored in the file. (The term *file* includes data base management system.) The programs or modules maintain each record in the file or file individually. Each input record's content and structure are read and matched with the record definition in the program or data base management system. If it does not match the record definition, it will be rejected. If it matches the record definition, it could be further validated with criteria established in the program or module. Assuming that it is a valid record, it may then update a record in file or combine with other input data and / or record in file and update a particular record. Human readable output data obtained during File maintenance should relate only to information regarding acceptance or rejection of the input data. (These output data are not to be confused with the data obtained during output production.)

The basic functions performed during file maintenance are:

- Addition of records
- Deletion of records
- Modification of records (the addition deletion or the updating of data attributes)
- Reading (accessing)data in a record without updating them

➢ Output production:-

In output production, programs or modules take data from a file or files and produce "reports," such as video screens, invoices checks, control reports, and files. It is worth emphasizing that by dividing the data processed into file maintenance and output production, the updating of the file has been completely separated from the production of output. Also, the production of a single report or a set of reports during one output production process is completely independent of every similar output production process.

➢ File / data base content and structure:-

It also follows that changing the file in content or organization has a direct impact on file maintenance and output production. So if a file is well designed in terms of the user's functional needs, it should not be necessary to change it unless the user's functions change.

➢ Systems, programs, and modules:-

We may appear to be putting the cart before the horse the terms *system*, *program*, and *module* have been used freely to this point without discussing what they mean.

System: a set of processes that meet specific needs. These processes require input and provide output to meet these need system exist everywhere and the world would collapse if nature did not operate very effective systems.

Program: a physical entity in a computer system which can stand alone. It has a specific name by which it is called or accessed from a library.

Module: a set of computer instructions that executes instructions on data input and produces data as output.

2.4 Application System Development Methodologies

➢ Generalized model of an ASDM:-

The major activities that make up an application system development methodology are as follows:

- Feasibility study
- Business specification
- System specification
- System design
- System development and testing
- System implementation
- System review

➢ Feasibility study:-

Project scope User's system objectives Performance requirements interfacing systems General description of system to be developed with alternate choices Impact on the organization Impact on the computer environment Development cost operating cost Benefits and risks.

➢ Business specification:-

Definition of the business objectives or the functions Definition of the data required to the objectives or the functions Definition of the logical records and files Definition of the data input Definition of the outputs (if required) Identification of when output or file data are required Identification of the need for centralized or decentralized files or databases Definitions of the input process logic Definitions of the output process logic (if required).

➢ System specification:-

Logical system divided into computerized and manual processes possible implementation options such as on-line and batch update, on-line data Access, and so on.

➢ **Strategy and Analysis System design:-**

Physical file or data-base design Network design Physical architecture of subsystems and programs Detailed program and model logic Test plans File conversion plans Hardware and software acquisition and installation plans Implementation strategy.

2.5 A System Development Life Cycle

From concept to production, you can develop a database by using the system development life cycle, which contains multiple stages of development? This top-down, systematic approach to database development transoms business information requirements into an operational database.

- Study and analyze the business requirements. Interview users and managers to identify the information requirements. Incorporate the enterprise and application mission statements as well as any future system specifications.
- Build models of the system. Transfer the business narrative into graphical representation of business information needs and rules.
- Experts.
- Design
- Design the database based on the model developed in the strategy and analysis phase.
- Build and Document
- Build the prototype system. Write and execute the commands to create the tables and supporting objects for the database.

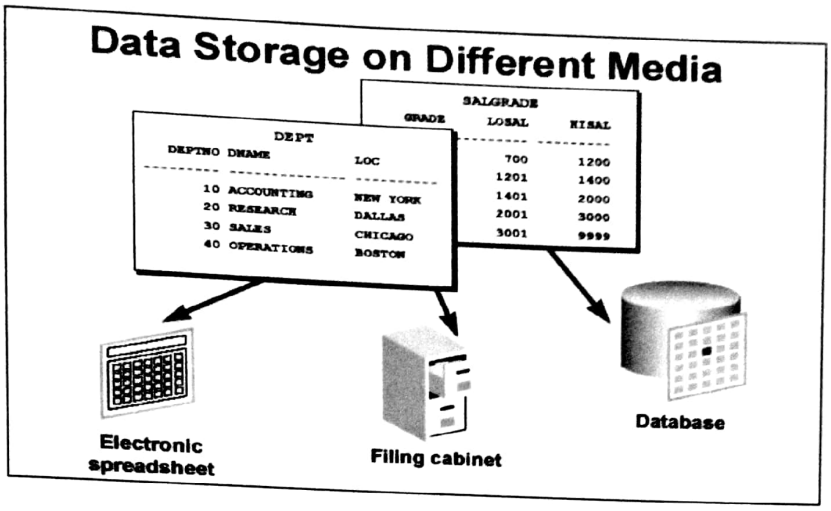

Figure 2.2 Data Storage on Different Media

Every organization has some information needs. A library keeps a list of members, books, due dates, and fines.

An organization needs to save information about employees, departments, and salaries. These pieces of information are called *data.*

Organizations can store data on various media and in different formats, such as a hard-copy document in a filing cabinet or data stored in electronic spreadsheets or in databases.

A ***database***is an organized collection of information.

To manage databases, you need database management systems (DBMS). A DBMS is a program that stores, retrieves, and modifies data in the database on request. There are four main types of databases: *hierarchical, network, relational,* and more recently *object relational*

2.6 Components of the Relational Model

- Collections of objects or relations that store the data
- A set of operators that can act on relations to produce other relation
- Data integrity for accuracy and consistency

Models are a cornerstone of design. Engineers build a model of a car to work out any details before putting it into production. In the same manner, system designers develop models to explore ideas and improve the understanding of the database design.

Objective is to produce a model that fits a multitude of these uses, can be understood by an end user, and contains sufficient detail for a developer to build a database system.

In an effective system, data is divided into discrete categories or entities. An entity relationship (ER)

Model is an illustration of various entities in a business and the relationships between them. An ER model is derived from business specifications or narratives and built during the analysis phase of the system development life cycle. ER models separate the information required by a business from the activities performed within a business. Although businesses can change their activities, the type of information tends to remain constant. Therefore, the data structures also tend to be constant.

➢ **Benefits of ER Modeling**

- Documents information for the organization in a clear precise format.
- Provides a clear picture of the scope of the information requirement.
- Provides an easily understood pictorial map for the database design.
- Offers an effective framework for integrating multiple applications