SYSTEM INETGRATION AND ARCHITECTURE

SYSTEM- a set of things working together as parts of mechanism or an interconnectinf network
INTEGRATION- the act or process or an instance of intergrating
ARCHITECTURE- the manner in which the components of a computer system are organized and integrated
SYSTEM INTEGRATION- is the process joining softwae and hardware

WHY DO WE NEED SYSTEM INTEGRATON?
1. INCREASED PRODUCTIVITY
-allow for centralized control over daily processes
2. FASTER DECISION MAKING
-extract useful business
3. MORE ACCURATE AND TRUSTWORTHY DATA
-data is updated
4. COST-EFFECTIVENESS
-system integration comes at a lower cost

HOW CAN WE ACHIEVE SYSTEM INTEGRATION?

A. **DIRECT DATABASE ACCESS**
   -to share information from your database to another system
B. **WEB SERVICES**
   -using protocols
C. **MESSAGING**
   -using message brokers

SYSTEM ANALYSIS AND DESIGN
-is a step by step process by developing high quality information systems

2 TYPES OF SAD
- **INFORMATION SYSTEM**
  -combines information technology, people and data support business requirements
- **SYSTEM ANALYSTS**
  -who plan, develop and maintain information systems

5 COMPONENTS OF IS
1. **HARDWARE –** consists of everything in the physical layer of the IS
2. **SOFTWARE-** programs that control the hardware
   2 TYPES OF SOFTWARE
   - **SYSTEM SOFTWARE**
     -manages the hardware components. Single work
   - **APPLICATION SOFTWARE**
     -programs that support day to day business functions

ENTERPRISE APPLICATIONS
-companywide app.

2 TYPES OF A/S
a. HORIZONTAL SYSTEM
-can be adapted
-such as inventory or payroll
b. VERTICAL SYSTEM
-designed to meet the unique requirements
-web based retailer or medical practice

3. **DATA-** consists of basic facts that are the system raw materials
4. **INFORMATION-**data that has been transformed
5. **PEOPLE-**stakeholders

UNDERSTAND THE BUSINESS
- **IT PROFESSIONALS-**must understand a company's operations to design successful system
- **BUSINESS PROFILE-**an overview of a company's vision and mission
- **BUSINESS PROCESS-**specific set of transactions, events and results
- **BUSINESS PROCESS MODEL**
  -explicitly displays one or more business processes

STRUCTURED QUERY LANGUAGE (SQL)
-designed to manage data stored in relational databases
RELATIONAL DATABASES
-organize information into one or more tables
TABLE-sometimes referred to as relations
-collection of data organized into rows and columns
COLUMN-set of data values of a particular type
ROW-single record in a table
STATEMENTS-text that the database recognizes as a valid command
- Always end in semicolon (;)

COMPONENTS OF A STATEMENT
CREATE TABLE-is a clause that perform specific task. Witten in capital letters and as command
TABLE_NAME-refers to the name of the table that the command is applied to
PARAMETER-list of columns, data types or values that are passed to a clause as argument
CREATE-allows us to create new table in the database
INSERT-insert a new row into a table
SELECT-used to fetch data
FROM-data is required from the celebs table and specifies the name of the table to query data from
ASTERISKS (*)-specifies all data in the table
WHERE-specifies that get all data that belong
ALTER-clause that lets you make the specified changes
ADD-add a new column to a table
NULL-special value in SQL that represents missing or unknown data
UPDATE-edits a row in a table and change existing records
DELETE-delete one or more rows from a table
DROP DATABASE IF EXISTS_____;
CREATE DATABASE_____;

.php- default file extension of PHP

//- use in comment
**"
" -** separate lines

BUILT IN FUNCTIONS
- **STRING LENGTH**

-strlen();

- **SHUFFLE**
  -str_shuffle ();

$_GET- returns the value from a GET method
$_POST-returns the value from a POST method

GET-data is visible in the URL
POST-data is not visible in the URL

DATA TYPES

NUMBERS
-$num=10;

STRING
$person= ();

ARRAY
$students=array ();

To print: echo $students []. $students[];

The Development of Enterprise Resource Planning Systems

How do they do that?

- Often, the key is to have efficient, integrated information systems

ENTERPRISE RESOURCE PLANNING (ERP)

- Programs are core software used by companies to coordinate information in every area of the business.
- ERP (pronounced "E-R-P") programs help to manage companywide business processes, using a common database and shared management reporting tools.

SILOS

- Marketing information system
- Production information system
- HR management system
- Supply and management system

NOTE: Such unintegrated systems might work well within individual functional areas, but to achieve its goals, a company must **share data among all the functional areas.**

Computer Hardware and Software Development

1960s - The first practical business computers were the **mainframe computers**

Over time, computers got faster, smaller, and cheaper, leading up to today's proliferation of mobile devices.

The rapid development of computer hardware capabilities has been accurately described by **Moore's Law**

1965- Intel employee Gordon Moore observed that the number of transistors that could be built into a computer chip doubled every 18 months

Early attempts to share resources

Personal Computer- as PCs gained popularity in business in the 1980s, managers became aware that important business information was being stored on individual PCs, but that there was no easy way to share the information electronically

Local Area Networks- by the mid-1980s, telecommunications developments allowed users to share data and peripherals on local networks

Client-Server Architecture- this meant that workers could download data from a central computer to their desktop PCs and work with the data at their desks.

Database Management System (DBMS) - this common database holds a very large amount of data. The technology to hold that data in an organized fashion, and to retrieve data easily

The Manufacturing Roots of ERP

Material Requirements Planning (MRP) - manufacturing software developed during the 1960s and 1970s, evolving from simple inventory tracking systems to material requirements planning (MRP) software.

Electronic data interchange (EDI) - the direct computer-to-computer exchange of standard business documents, allowed companies to handle the purchasing process electronically, avoiding the cost and delays resulting from paper purchase order and invoice systems

Supply Chain Management (SCM) - the functional area began with the sharing of long range production schedules between manufacturers and their suppliers

MOBILE PROGRAMMING

Mobile Computing- is a technology that allows us to transmit data, audio, and video via devices that are not connected with any physical link.

- The key features of mobile computing: **portable and connected over a network.**

- began with the **first laptops** developed in 1980, and from there, rapidly grew in capability with the 640*640 portable laptops from Apple in 1990, the development of the first PDA in 1993, the first smartphone from IBM released in 1994, network connectivity enabled smartphones in 2000, the first iPhone released in 2007, and the first android smartphone in 2009.

Major Elements of Mobile Computing

- **Mobile Communication:** refers to the communication infrastructure set in place,
- **Mobile Hardware:** is the mobile computing devices and supporting devices, with the capabilities required to perform their required operations and connect to networks.
- **Mobile Software:** The most important software component is the **operating system,** which is the brain of any computing system smartphone

Mobile Computing Devices- have a body- made of metal or plastic, a RAM, a CPU, a hard drive, a motherboard, a keyboard and a mouse- which could be separate components in the body or touch-based, a screen, a video card, an operating system, software applications, and finally, a network connection.

- **Laptops** (Acer, ASUS, Dell, Hp, Macbook)
- **Smartphones** (iPhone, Xiaomi, Samsung, Google Pixel)
- **Tablet Computers** (iPad, Huawei MatePad)
- **Wearable** (Apple Watch, Huawei Smartwatch)
- **E-reader** (Amazon Kindle)

FEATURES

- **Size -** Reduction in size without reducing capabilities have also always been a challenge when developing mobile devices.
- **Power Source-** usually powered by rechargeable batteries.
- **Operating System -** Laptops run on more or less the same OS as PCs, but for smartphones and other devices, the OS is significantly different. They are powerful but scaled-down and made specifically for particular devices.
- **Connectivity -**have capabilities that allow access to the internet. Also, mobile devices like smartphones have access to mobile broadband networks that allow you to make and receive phone calls.
- **Applications -** are specifically designed for running on a particular OS. These applications are what extends the capabilities of devices beyond just connecting to the internet or making calls.

Advantages and Limitations of Mobile Computing

Advantages	Limitations
Portability	Security
Affordability	Connectivity Issues
Data Access	Device size
Increased in Productivity	Power consumption
Entertainment	
Cloud Computing	

Mobile Application- is a **software application developed specifically for use with a mobile device** such as a smartphone or tablet.

Brief history of mobile applications

- In **1984**, we saw the launch of the Psion Organizer. This was the "World's First Practical Pocket Computer". It was loaded with apps such as a calculator and a clock.
- In **1994**, IBM introduced 'Simon' This Personal Digital Assistant could send and receive faxes and emails. It also featured applications such as an address book, calendar, and meeting schedule. Many people think of this as the world's first true smartphone.
- In **2002**, Blackberry launched its smartphone. This featured an email function. It quickly became the 'must-have' device for the business person on the move.
- Apple launched its iPhone in **2007**.

Mobile Application Development- Mobile application development is the process of creating software applications that run on a mobile device.

TWO DOMINANT PLATFORMS

-iOS platform from Apple Inc.- The iOS platform is the operating system that powers Apple's popular line of iPhone smartphones.

-Android from Google- is used not only by Google devices but also by many other OEMs to build their own smartphones and other smart devices.

3 Main type of Mobile Applications

- **Native Apps**
- **Progressive Web Apps**
- **Hybrid Apps**

Native Applications- is written for **use on a specified platform or device**. (Apple's iOS and Google's Android account for 99% of mobile devices.)

Progressive Web Applications- needs only a web browser to work. Unlike native apps, **progressive web apps (PWAs)** will therefore **work on any mobile platform**

Hybrid Applications- hybrid app combines aspects of native and web apps**.**

Pros and Cons of Native, PWA and Hybrid Applications

NATIVE	PWA	HYBRID
Pros		
Best runtime performance	Same app is available both for web and mobile	Shared code base between web and mobile apps
Direct access to API's	No installation required, accessible through a URL	Using web development skillset for building mobile apps
Cons		
Higher costs when building and maintaining your app	Limited support for native device features	Lower performance compared to native apps
Multiple code-bases for each platform	App capabilities depend on the browser in use	Limited support for native device features

Front-End Mobile Application- The mobile front-end is the visual and interactive part of the application the user experiences.

Mobile Application Front-End Frameworks- is a software creation platform that includes tools and software, compilers, debugging tools, and programming interfaces, among other things.

React Native - built and supported by Facebook, is an accessible, cross-platform application development framework that has quickly become the preferred option of programmers.

Features of React Native

Exceptional Performance
Components can be reused
Compatibility with third-party extensions

Flutter- is a comprehensive and precise framework that contains widgets, a rendering engine, debugging and integrating APIs, and resources to assist developers in creating and deploying beautiful mobile applications

Features of Flutter

- More rapid development.
- Cross-platform.
- Visuals that are both appealing and engaging.
- Performance that is pretty similar to that of a native

Ionic- c is an explicit framework for crafting Progressive Web Apps (PWAs), hybrid, and cross-platform mobile applications.

Features of Ionic

- App development for many platforms.
- The user interface is consistent.
- Enhanced performance.
- The flexibility of the user

User Interface (UI) - A user interface is the interface through which a user interacts with a device.

User interface (UI) design is a design discipline focused on the visual elements of the interface, for example:

- **Layout**: Where do elements appear on the screen?
- **Colors**: What palette is used and what emotions do those colors evoke?
- **Typography**: What typefaces are used and what do they communicate?
- **Interaction design**: How do elements respond to user interaction?
- **Brand identity**: How do all of the visual elements come together to represent the brand's vision?
- **Responsiveness and usability**: Is the interface easy to use across different devices?
- **Accessibility and inclusivity**: Does the interface work for everyone?
- **Front-end development**: What is the code and technical backbone powering the interface?

User experience (UX)-describes the entire experience around a product or service, taking into account the user's emotional state, the context or environment, and the designed system or artifact.

User experience (UX) design is a human-centered design discipline that addresses the holistic experience of a product, focused on:

- **User journey**: The entire process surrounding use of a product, from the problem to be solved through the impact of the solution.
- **User research**: Qualitative and quantitative research to put the user at the center of the design process.
- **Deliverables** to document the user experience and define the workflows and features of a product or design, such as:
    - **Personas**: Summaries of example and target users, generally based on a composite of user research.
    - **Journey Maps**: A timeline of user actions related to accomplishing a particular goal related to a product or design.
    - **Storyboards**: A sequence of panels (often resembling a comic book) depicting a user story chronologically.
    - **Prototypes**: Iterative models, sketches or wireframes of a design used to gather feedback and inform the final design.

Five Elements of UX Design

1. **Strategy-** This layer, the most abstract of the model, takes into consideration both user needs and business goals.
2. **Scope-** Within this layer, the team defines functional requirements (what features to build) and content requirements (written and visual information to include).
3. **Structure-** This layer includes information architecture (the structure and organization of content) and interaction design (the interactive experience of the product).
4. **Skeleton-** This layer begins to consider interface design (design of interface elements), navigation design (how users move through a system), and information design (presenting information to facilitate understanding). A common output at this stage is a set of wireframes
5. **Surface-** This stage emphasizes visual design, for example, what colors and typefaces are used, and is the stage where UI design is front and center (though it is not exclusive to the surface).

User and End-User

User- refers broadly to anyone who may use or maintain the product, and could include people such as system administrators, IT experts, and computer technicians.

End-user- the person intended to ultimately use the product, who may not have the technical know-how or skill of the product's administrators.

The Product Development Life Cycle consists of 5 stages:

1. **Brainstorm**: Starting from a defined problem or pain point, the team brainstorms all possible solutions.
2. **Define**: The team aligns on specifications for the product by defining the vision, goals, target users, features, benefits, and success metrics.
3. **Design**: The product is designed from low-fidelity to high-fidelity, starting with sketches and wireframes and moving to prototypes and a completed interface.
4. **Test**: The product or prototype is tested to ensure it works as intended.
5. **Launch**: The final design is released to the public, but the cycle doesn't end here.

Wireframe- is a low-fidelity representation of a digital interface.

Widgets- are the bedrock of flutter applications

ROOT WIDGET- surrounds everything in the entire application

Nested- inside that widget we have the **App Bar Widget** at the top of this strip

Text Widget- which is the actual title of the app.

Widget tree- in flutter just describes the structure of widgets inside your app.

Text widget, or a button widget- to create a button

Row and Column widget - which has something to do with the layout

Image widgets- plus many more as we continue throughout this course.

Dart- is a programming language developed by Google to build mobile, desktop and web applications.