Week 5 Review

- Transaction Processing Systems
  - Methods, objectives, activities, applications
- Enterprise Resource Planning
- Supply Chain Management
- Decision Making and Problem Solving

Objectives

- Explore the challenges in knowledge management and business intelligence and its benefits to the organizations
- Define artificial intelligence and the objective of developing artificial intelligence systems
- Describe expert systems and its applications
- Describe multimedia and virtual reality and its application in business
- Discuss specialized systems

Knowledge Management Systems

- Data, Information
- Knowledge
  - Awareness and understanding of a set of information

Data	• There are 20 PCs in stock at the retail store.
Information	• The store will run out of inventory in a week unless more is ordered today.
Knowledge	• Call 800-555-2222 to order more inventory.

Reference:
Reynolds, G. (2014). *Information Systems Principles. Philippine Edition*. Cengage Learning Asia Pte.

Knowledge Management Systems

- Knowledge management system (KMS):
  - Organized collection of people, procedures, software, databases, and devices
  - Used to create, store, share, and use the organization's knowledge and experience

- Explicit knowledge:
  - Objective and can be measured and documented in reports, papers, and rules

- Tacit knowledge:
  - Typically not objective or formalized and hard to measure and document

Data and Knowledge Management Workers and Communities of Practice

- Data workers:
  - Secretaries, administrative assistants, bookkeepers, data entry people, etc.

- Knowledge workers:
  - Professionals in science, engineering, or business; writers; researchers; educators; corporate designers; etc.

- Chief knowledge officer (CKO):
  - Top-level executive who helps the organization use a KMS to create, store, and use knowledge to achieve organizational goals
- Communities of practice (COP):
  - Group of people dedicated to a common discipline or practice
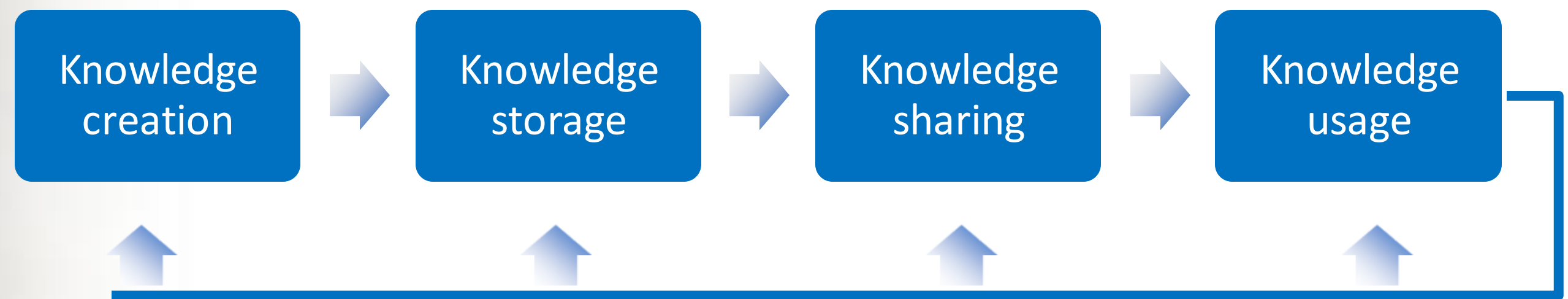
Obtaining, Storing, Sharing, and Using Knowledge

- Knowledge workers:
  - Often work in teams
- Knowledge repository:
  - Includes documents, reports, files, and databases

Obtaining, Storing, Sharing, and Using Knowledge

- Knowledge Map
  - Points the knowledge worker to the needed knowledge

- Knowledge Management System

Knowledge creation		Knowledge storage		Knowledge sharing		Knowledge usage

Reference:
Reynolds, G. (2014). *Information Systems Principles. Philippine Edition*. Cengage Learning Asia Pte.

Technology to Support Knowledge Management

- Effective KMS:

  - Is based on learning new knowledge and changing procedures and approaches as a result

- Data mining and business intelligence can help capture and use knowledge

Technology to Support Knowledge Management

Company	Description	Web Site
Knowledge Management World	Knowledge management publications, conferences, and information.	http://www.kmworld.com/[11]
Knowledge Management Online	Provides online information, articles, and blogs on knowledge management	http://www.knowledge-management-online.com/[12]
CortexPro	Knowledge management collaboration tools	www.cortexpro.com[13]
Delphi Group	A knowledge management consulting company	www.delphigroup.com[14]
KM Knowledge	Knowledge management sites, products and services, magazines, and case studies	www.kmknowledge.com[15]
Knowledge Management Solutions, Inc.	Tools to create, capture, classify, share, and manage knowledge	www.kmsi.us[16]
KnowledgeBase	Content creation and management	www.knowledgebase.com[17]

Reference:
Reynolds, G. (2014). *Information Systems Principles. Philippine Edition.* Cengage Learning Asia Pte.

Business Intelligence Systems

- Business Intelligence
  - Information about the organization, its customers, or its suppliers
- Competitive Intelligence
  - Aspect of BI limited to information about competitors and the ways that knowledge affects strategy, tactics and operations

Data Mining and Online Analysis

- Data Warehouse

  – Large database containing historical transactions and other data

  – Useless without software tools to process the data into meaningful information

- Data mining

  – Process of selecting, exploring, and modeling large amounts of data to discover relationships that can support decision making

- Four main objectives:
  - Sequence or path analysis
  - Classification
  - Clustering
  - Forecasting

Data Mining

Data Mining

Amazon's Gotye Store

Music	Photos	Biography

Fairfax Recordings / Universal Republic
ABOUT MAKING MIRRORS
Ask Belgian-born Gotye about his new album Making Mirrors (Fairfax Recordings / Universal Republic), out this winter, and he'll speak not of songs, but of sounds. Listen to Making Mirrors and you'll be drawn in by the details, transported to a world where every moment matters.
Making Mirrors, which received four stars from Rolling Stone,… Read more in Amazon's Gotye Store

> **Visit Amazon's Gotye Store**
for 3 albums, 3 photos, discussions, and more.

Special Offers and Product Promotions

- Get $1 in Amazon MP3 credit with qualifying purchase. Limited to one promotional credit per customer. Here's how (restrictions apply)

Frequently Bought Together

Customers buy this album with Port of Morrow ~ The Shins Audio CD $9.99

Price For Both: $19.98

Add both to Cart   Add both to Wish List

Show availability and shipping details

Customers Who Bought This Item Also Bought   Page 1 of 17

Some Nights ~ Fun.	Born to Die ~ Lana Del Rey	Port of Morrow ~ The Shins	Young The Giant ~ Young the Giant	Vows ~ Kimbra	Never Trust a Happy Song ~ Grouplove
★★★★☆ (50)	★★★★☆ (152)	★★★★☆ (15)	★★★★☆ (44)	★★★★☆ (10)	★★★★★ (17)
$9.99	$7.99	$9.99	$8.99	$25.60	$11.58
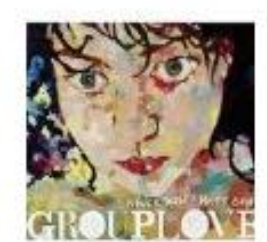
Data Mining

- Data mining techniques are applied to various fields:

  – Marketing

  – Fraud detection

  – Targeted marketing to individuals

FIGURE 11.1
Potential applications of data mining

DATA-MINING APPLICATION	DESCRIPTION
Consumer clustering	Identify the common characteristics of customers who tend to buy the same products and services from your company.
Customer churn	Identify the reason customers switch to competitors; predict which customers are likely to do so.
Fraud detection	Identify characteristics of transactions that are most likely to be fraudulent.
Direct marketing	Identify which prospective clients should be included in a mailing or e-mail list to obtain the highest response rate.
Interactive marketing	Predict what each individual accessing a Web site is most likely to be interested in seeing.
Market basket analysis	Understand what products or services are commonly purchased together, and on what days of the week.
Trend analysis	Reveal the difference between a typical customer this month and a typical customer last month.

Online Analytical Processing

- Online analytical processing (OLAP)
  - Type of application used to exploit data warehouses
  - Provides extremely fast response times
  - Allows a user to view multiple combinations of two dimensions by rotating virtual "cubes" of information

Online Analytical Processing

- OLAP application composes tables "on the fly" based on the desired relationships

- OLAP applications are powerful tools for executives

Online Analytical Processing

FIGURE 11.3
Using OLAP tables

Sales ($ 000)			
	Model 1	Model 2	Model 3
North America	115800	136941	53550
South America	72550	63021	25236
Asia	65875	53781	17136
Total	**254225**	**253743**	**95922**

Sales (Units)			
	Model 1	Model 2	Model 3
North America	4632	6521	2975
South America	2902	3001	1402
Asia	2635	2561	952
Total	**10169**	**12083**	**5329**

North America (Units)			
	Model 1	Model 2	Model 3
Red	2401	1785	2512
Blue	1766	527	52
White	465	4209	411
Total	**4632**	**6521**	**2975**

North America Dealerships (Units)			
	Model 1	Model 2	Model 3
Dealer 1	102	556	2011
Dealer 2	1578	2450	108
Dealer 3	2358	0	10
Dealer 4	20	520	57
Dealer 5	574	2995	789
Total	**4632**	**6521**	**2975**

Online Analytical Processing

- OLAP applications are usually installed on a special server

- OLAP applications are usually significantly faster than relational applications

Online Analytical Processing

- OLAP is increasingly used by corporations to gain efficiencies
  - BI software is becoming easier to use; intelligent interfaces accept queries in free form

More Customer Intelligence

- A major effort of business is collecting business intelligence about customers

- Data-mining and OLAP software are often integrated into CRM systems

- Web has become popular for transactions, making data collection easy

- Targeted marketing is more effective than mass marketing

More Customer Intelligence

- Data from customer activity on a Web site may not provide a full picture

- Third-party companies may be hired to study consumer activity

  - Determine consumers' interests by capturing where, what, when, and how often Web pages are visited, ads are clicked, and transactions are completed

- Dashboard: an interface between BI tools and the user

  – Contains visual images to quickly represent specific business metrics of interest to management

  – Helps management monitor revenue and sales, monitor inventory levels, and pinpoint trends and changes over time
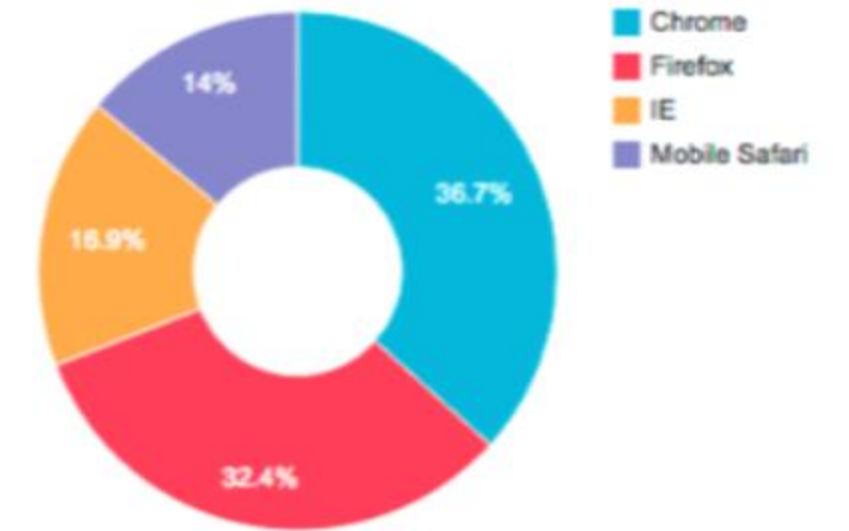
Dashboards

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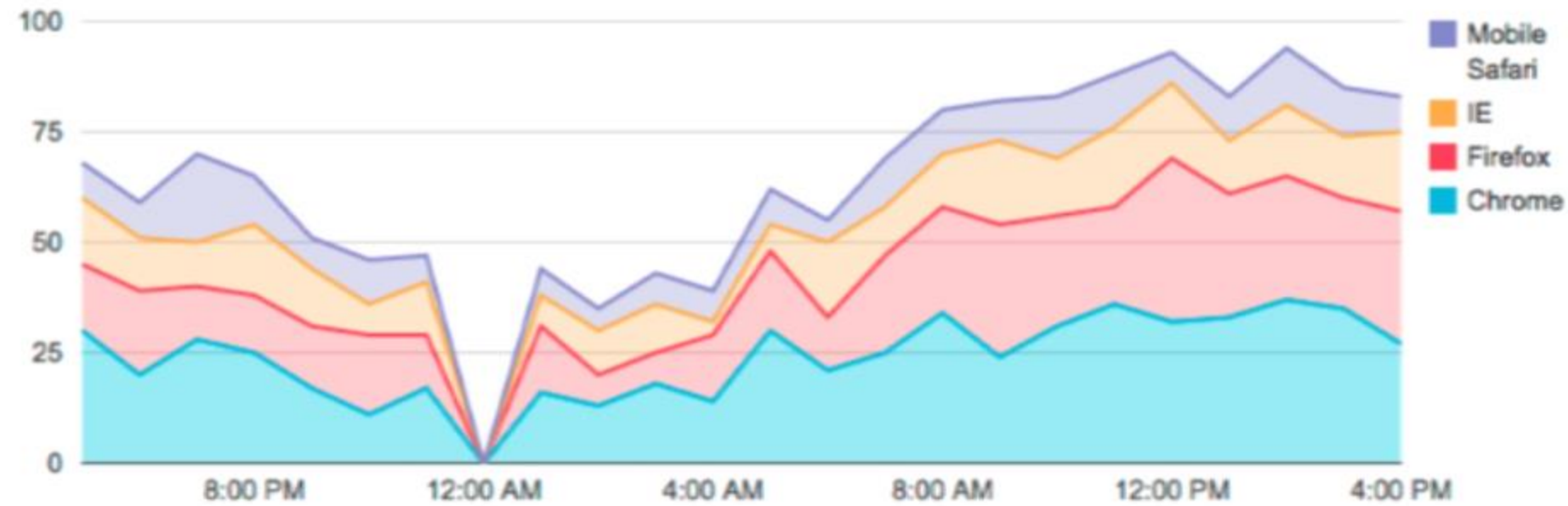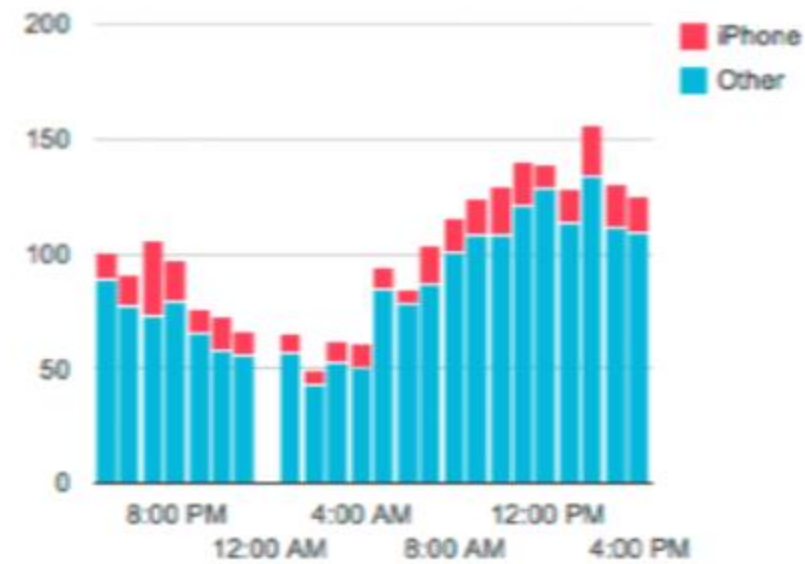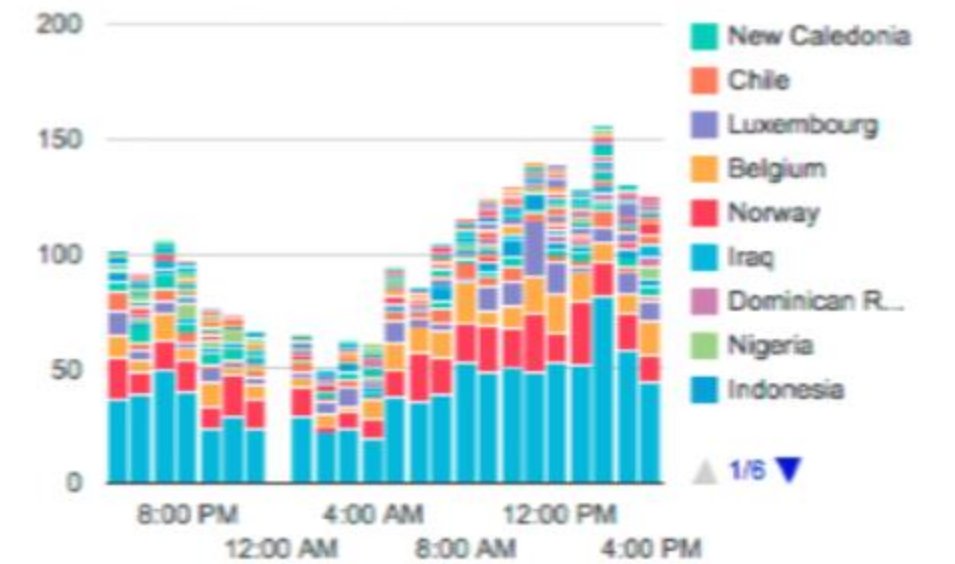
Artificial Intelligence in Perspective
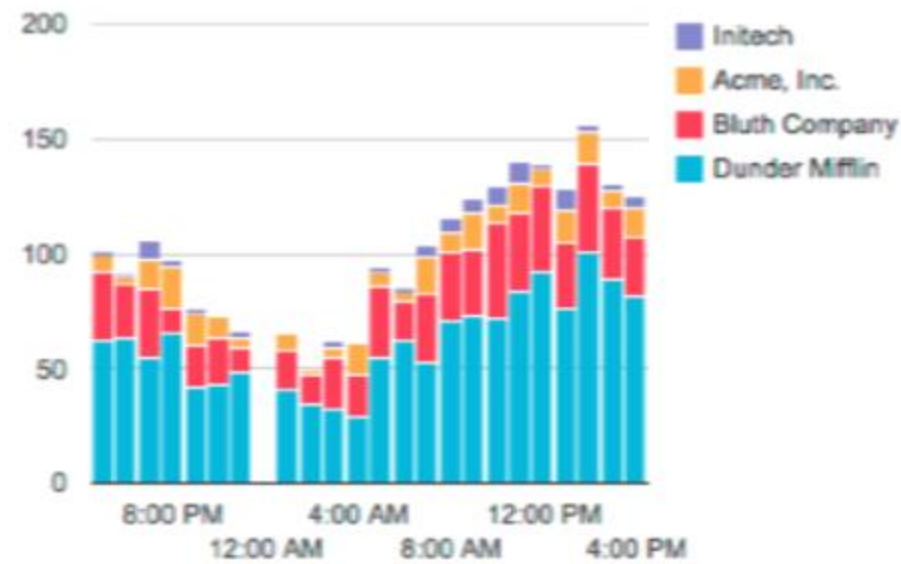
- Artificial intelligence systems:
  - Include the people, procedures, hardware, software, data, and knowledge needed to develop computer systems and machines that demonstrate characteristics of intelligence

JEOPARDY! — The IBM Challenge

On February 14, 2011, IBM Watson changed history, introducing a system that rivaled a human's ability to answer questions posed in natural language with speed, accuracy, and confidence.

Watson Wins!

- Largest Jeopardy! in 5 years
- 34.5M Jeopardy! Viewers
- 1.3B+ Impressions
- Over 10,000 Media Stories
- 11,000 attend watch events
- 2.5M+ Videos Views (top 10 only)
- 12,582 Twitter
- 25,763 Facebook Fans
- Emmy Award for Watson show of Jeopardy!

*Reference: IBM Philippines

February 2011 Watson beats Jeopardy Champions Ken Jennings and Brad Rutter

What Watson does:

Interprets and understands language, in context	Understands ambiguous and imprecise questions using sophisticated natural language algorithms
Analyzes large volumes of data	Can handle large amounts of unstructured data
Generates and evaluates hypotheses and quantifies confidence in answers	Identifies many answers to questions with evidence to "explain" rationale for answers
Adapts and learns to improve results over time	Learns from additional evidence, additional questions and mistakes to improve accuracy over time

*Reference: IBM Philippines

The Nature of Intelligence

- Turing Test:
  - Determines whether responses from a computer with intelligent behavior are indistinguishable from those from a human being
- Characteristics of intelligent behavior include the ability to:
  - Learn from experiences and apply knowledge acquired from experience
  - Handle complex situations
  - Solve problems when important information is missing

The Nature of Intelligence

- Determine what is important

- React quickly and correctly to a new situation

- Understand visual images

- Process and manipulate symbols

- Be creative and imaginative

- Use heuristics

The Brain Computer Interface

- Brain Computer Interface (BCI):

  – Idea is to directly connect the human brain to a computer and have human thought control computer activities

- If successful:

  – The BCI experiment will allow people to control computers and artificial arms and legs through thought alone

The Major Branches of Artificial Intelligence
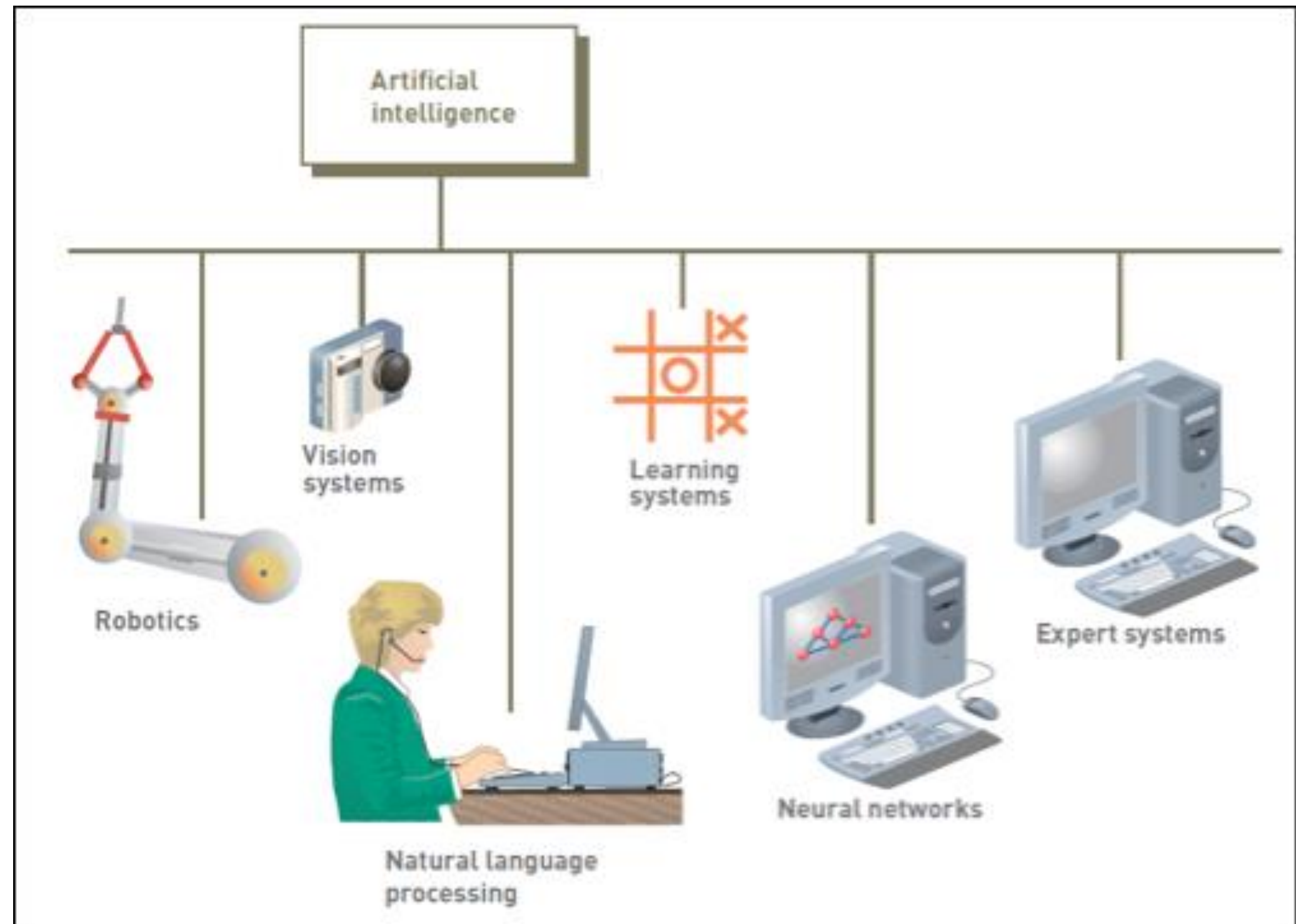
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Robotics

- Developing mechanical devices that can:
  - Paint cars, make precision welds, and perform other tasks that require a high degree of precision
- Manufacturers use robots to assemble and paint products
- Contemporary robotics:
  - Combine both high-precision machine capabilities and sophisticated controlling software

Rapiro

HAL

Giraff

Vision Systems

- Hardware and software that permit computers to capture, store, and manipulate visual images and pictures

- Effective at identifying people based on facial features

Natural Language Processing and Voice Recognition

- Processing that allows the computer to understand and react to statements and commands made in a "natural" language, such as English

- Voice recognition:

  – Converting sound waves into words

Learning Systems

- Combination of software and hardware that:
  - Allows the computer to change how it functions or reacts to situations based on feedback it receives

- Learning systems software:
  - Requires feedback on results of actions or decisions

- Computer system that simulates functioning of a human brain

  - Can use massively parallel processors in an architecture that is based on the human brain's own mesh-like structure

- Can process many pieces of data at the same time and learn to recognize patterns

Other Artificial Intelligence Applications

- Genetic algorithm:
  - Approach to solving complex problems in which a number of related operations or models change and evolve until the best one emerges

- Intelligent agent:
  - Programs and a knowledge base used to perform a specific task for a person, a process, or another program

An Overview of Expert Systems

- Expert systems behave similarly to a human expert in a particular field

- Computerized expert systems:

  - Use heuristics, or rules of thumb, to arrive at conclusions or make suggestions

When to Use Expert Systems

- People and organizations should develop an expert system if it can:
  - Provide a high potential payoff or significantly reduce downside risk
  - Capture and preserve irreplaceable human expertise
  - Solve a problem that is not easily solved using traditional programming techniques
  - Develop a system more consistent than human experts

Components of Expert Systems

- Expert system:
  - Consists of a collection of integrated and related components
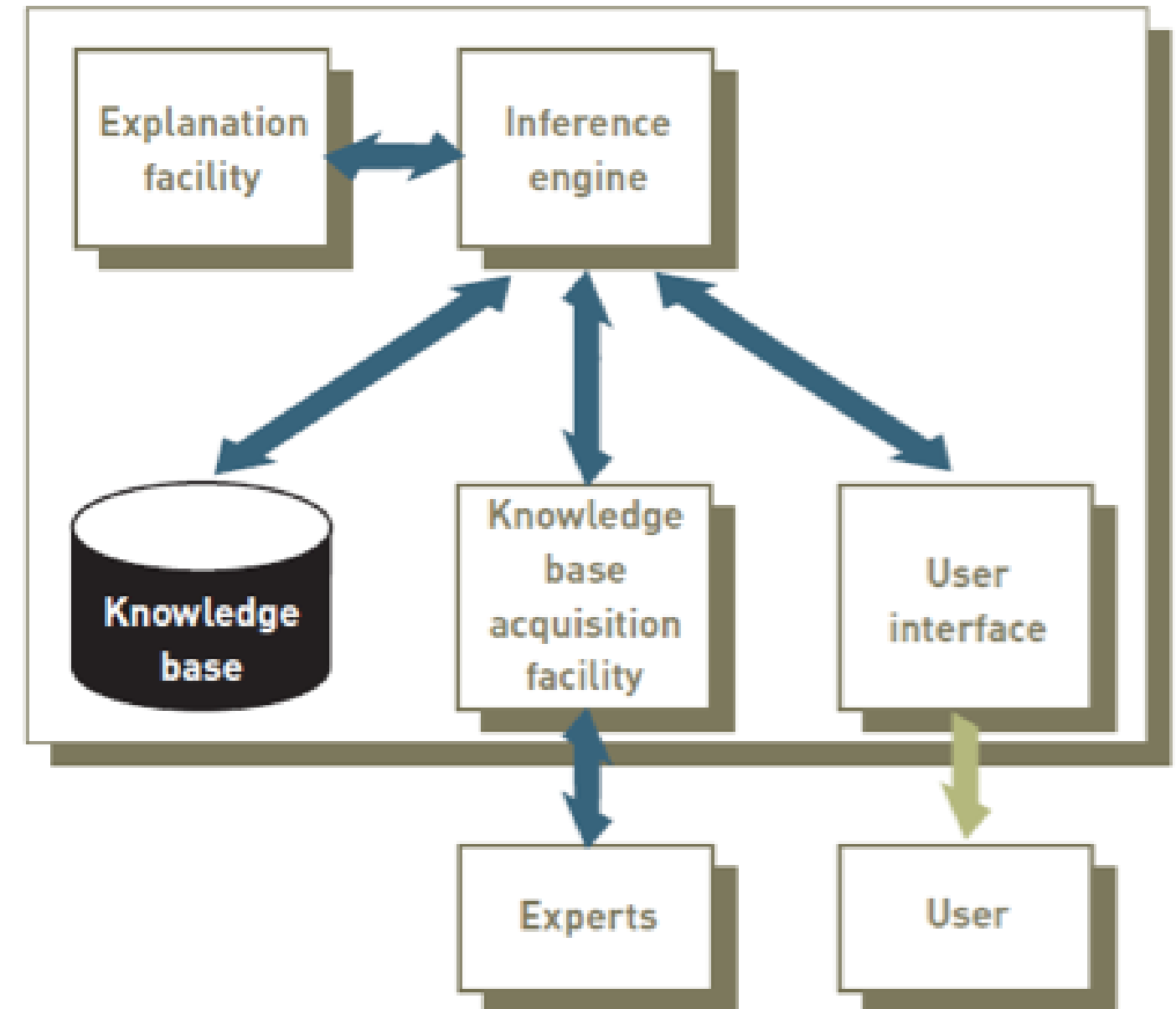
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Reynolds, G. (2014). *Information Systems Principles. Philippine Edition.* Cengage Learning Asia Pte.

- Knowledge base:

  –Stores all relevant information, data, rules, cases, and relationships used by expert system

  –Creates knowledge base by:

  - Using rules
  - Using cases

- Purpose:

  – To seek information and relationships from the knowledge base

  – To provide answers, predictions, and suggestions, like a human expert

The Explanation Facility

- Allows a user or decision maker to understand how the expert system arrived at certain conclusions or results

  - Indicate all the facts and rules that were used in reaching the conclusion

The Knowledge Acquisition Facility

- Provides convenient and efficient means of capturing and storing all components of knowledge base

- Knowledge acquisition software:
  - Can present users and decision makers with easy-to-use menus

The User Interface

- Permits decision makers to develop and use their own expert systems

- Main purpose:

  – To make development and use of an expert system easier for users and decision makers

Participants in Developing and Using Expert Systems
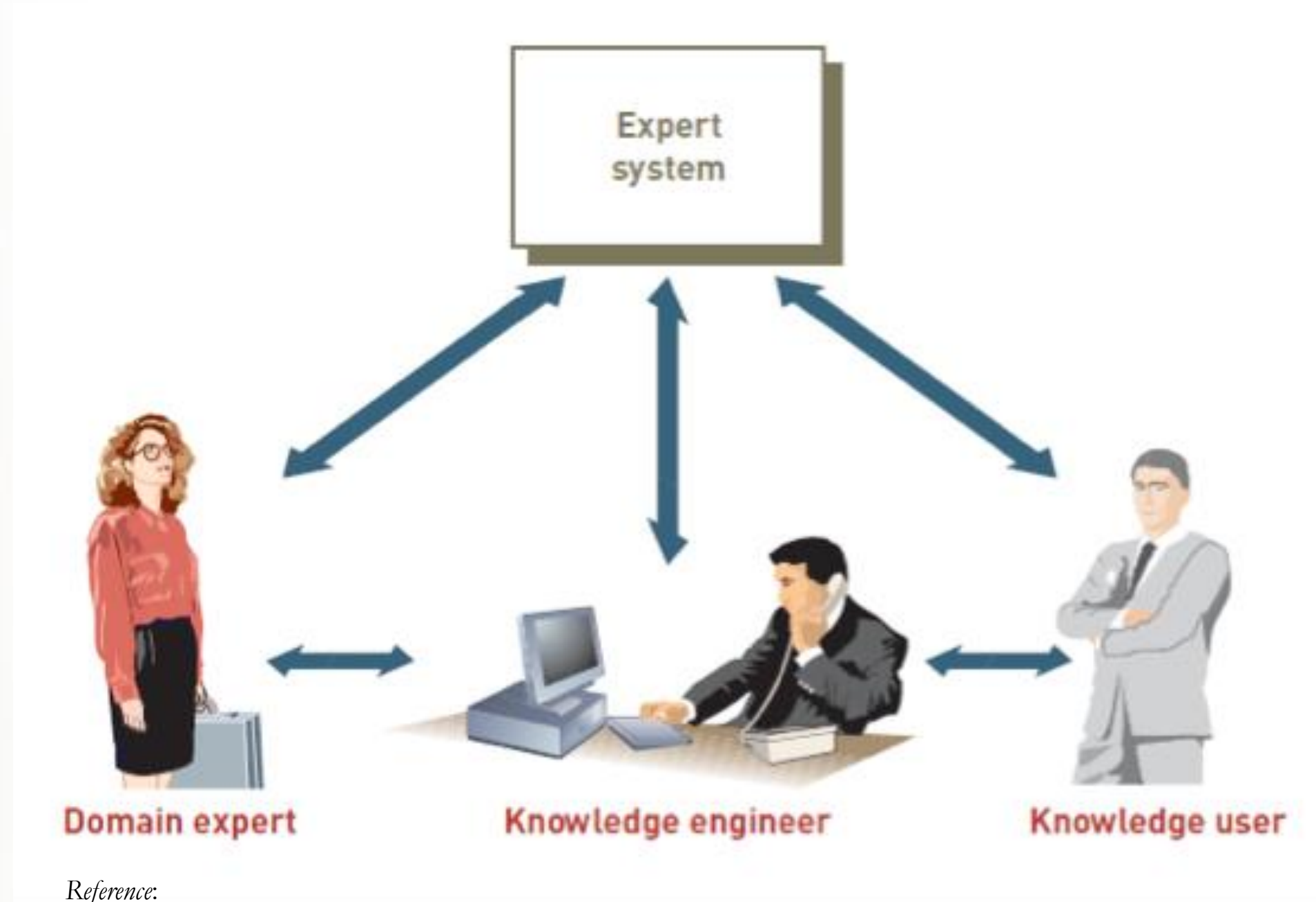
Expert system

Domain expert — Knowledge engineer — Knowledge user

Reference:
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Expert Systems Development Tools and Techniques

- Theoretically, expert systems can be developed from any programming language

- Expert system shells and products:

  - Collections of software packages and tools used to design, develop, implement, and maintain expert systems

Expert Systems Development Tools and Techniques

Name of Product	Application and Capabilities
Exsys Corvid	An expert system tool that simulates a conversation with a human expert from Exsys (www.exsys.com)[53]
EZ-Xpert	A rule-based expert system that results in complete applications in the C++ or Visual Basic programming languages by EZ-Xpert (www.ez-xpert.com)[54]
G2	Assists in oil and gas operations; Transco, a British company, uses it to help in the transport of gas to more than 20 million commercial and domestic customers
HazMat Loader	Analyzes hazardous materials in truck shipments (http://hazmat.dot.gov)
Imprint Business Systems	Has an expert system that helps printing and packaging companies manage their businesses (www.imprint-mis.co.uk)
Lantek Expert System	Helps metal fabricators reduce waste and increase profits (www.lantek.es)
RAMPART	Developed by Sandia National Laboratories, the U.S. General Services Administration (GSA) uses it to analyze risk to the approximately 8,000 federal buildings it manages (www.sandia.gov)

Reference:
Reynolds, G. (2014). *Information Systems Principles. Philippine Edition.* Cengage Learning Asia Pte.

Multimedia and Virtual Reality

- Use of multimedia and virtual reality:

  – Has helped many companies achieve a competitive advantage and increase profits

- The approach and technology used in multimedia:

  – Is often the foundation of virtual reality systems

Overview of Multimedia

- Multimedia is:

  – Text and graphics, audio, video and animation, file conversion and compression

- Designing a multimedia application:

  – Requires careful thought and a systematic approach

  – Requires that the end use of the document or file be carefully considered

Overview of Virtual Reality

- Virtual reality system:

  – Enables one or more users to move and react in a computer-simulated environment

- Immersive virtual reality:

  – User becomes fully immersed in an artificial, 3D world that is completely generated by a computer

- To see in a virtual world:

  – Often the user wears a head-mounted display (HMD) with screens directed at each eye

- Haptic interface:

  – Relays sense of touch and other sensations in a virtual world

  – Most challenging to create

Forms of Virtual Reality

- Immersive virtual reality

- Applications that are not fully immersive:

  - Mouse-controlled navigation through a 3D environment on a graphics monitor

  - Stereo projection systems

  - Stereo viewing from the monitor via stereo glasses

Virtual Reality Applications

- Medicine:

  – VR program called SnowWorld helps treat burn patients

- Education and training:

  – Virtual technology has also been applied by the military

Specialized Systems

- Segway:

  - Uses sophisticated software, sensors, and gyro motors to transport people

- Radio Frequency Identification (RFID) tags:

  - Contain small chips with information about products or packages

  - Can be quickly scanned to perform inventory control

Specialized Systems

- Game theory:
  - Involves the use of information systems to develop competitive strategies for people, organizations, or even countries

- Informatics:
  - Combines traditional disciplines, such as science and medicine, with computer systems and technology