2: What are the key elements of a data warehouse? Describe each one.

There are four important key elements in term of Data warehouse architecture.

**First one is data source** which actually indicates “from where data is generated”. It is the origin of raw data. Data can be generated from different sources like ERP system, legacy system, point of sell, web usage, government body, business organization and so on. For analysis purpose data warehouses are developed from structured data sources. If we need to use unstructured data for analysis, at first, it is required to convert structured data before send it to DW. Based on data source, data are classified into different category such as **Operations data** – come from all business related application, **specialized application data** - data from POS, ecommerce application. **External syndicated data**-available for public like weather data.

**The way of Data transformation** is second vital element of data warehouse architecture. Here, quality full data is selected based on need for decision making from operational database sources or other application on daily basis. Then data need to clean by removing any irregularities or missing values and if require another fields data is combined. Then whole data should be brought to meaningful format as the central table of data warehouse. This whole procedure is known as ETL which means Extract, transform, loading.

**Third element is data mart**. It is process of data storage which contains information to an organization’s business unit. It holds small portion of data which already saved in large storage system. For data mart, most preferable data architecture is star schema where one central table responsible to provide all information. This central table contains the code or id of lookup table that provide all detail information. There is another data architecture is snowflake. the difference between star and snowflake is, lookup table might have it’s own lookup table.

**Fourth key element is DW accessing.** Data can be accessed by many users through several devices and application for different purposes. DW data could be used for reporting, dashboard analysis , ad-hoc queries and data mining purpose.

4. How will data warehouse evolve in the age of social media?

Now -a- days, social media became a platform where individuals express their desire, emotion and opinion. Large amount of unstructured data like image, video, and text are being generated from social media daily basis. By analyzing these data, it is possible to make an idea about user behavior, intend, and sentiment, which could be valuable for any organization and business. There are various ways of data warehouse that assists to evolve in the age of social media. Data warehouse need to be integrated to collect, store and analysis social media data. As we said vast amount of unstructured data is produced from social media by user, so unstructured data need to be converted to structured data before saving to Data warehouse like NoSQL database- HIVE, HBASE. Another significant thing is real-time data processing, because huge amount of data is generated quickly by millions of user same time. To compete in market, it is important to find immediate insight, knowledge, understand consumer mindset and taking quick decision. So, Data warehouse plays a great role for real-time and right-time data processing by providing user to make quick and on-fly query on data of data warehouse.

Data warehousing is likely to evolve significantly in the age of social media, as social media generates vast amounts of data that can be valuable for businesses and organizations. Data warehouses may need to integrate with social media platforms to collect data in real-time. This could involve extracting data from APIs, webhooks, or other data streams provided by social media platforms. Social media data can be used to make predictions about consumer behavior, such as which products they are likely to purchase, or which content they are likely to engage with. Data warehouses could be used to store and analyze social listening data, helping organizations track their brand reputation and identify trends in consumer sentiment.

How will data warehousing evolve in the age of social media?

-    With the strong development of social media leading to an explosion of data likes images, videos, text… so the data warehouse is important that helps organizations store, analyze and collect information from social media data.  
-    There are many ways that help to evolve in the age of social media data:

* Unstructured data processing: most social media data is unstructured data, so we need to be structured the data before inserted into the Data warehouse likes NoSQL databases (Hive, Hbase…)
* Near Real-time or right-time processing: because the social media data is huge in real-time, so we need to process and analyze the data quickly to produce desired reports and deliver insights and make better decisions. So data warehouse is a good solution that evolving to support the near real-time or right-time processing

-    Overall, the data warehouse is a special data management that intended for producing reports and analysis to support decision making

Comment:

The rise of social media has transformed the way data is generated and consumed, and this has had a significant impact on data warehousing. To keep up with the changes, data warehousing systems will need to evolve and adapt to incorporate social media data and provide real-time insights using advanced analytics techniques. The integration of social media data will require new technologies and tools that can handle the large volumes of data generated by social media platforms. Real-time data processing will be critical to providing insights quickly, and advanced analytics techniques such as natural language processing and machine learning will be needed to extract meaningful insights from unstructured social media data. Ensuring data privacy and security will also be important, given the sensitivity of social media data. Finally, scalability will be essential to handle the growth in data volumes generated by social media platforms. By evolving to incorporate social media data, data warehousing systems can continue to provide valuable insights that help businesses make informed decisions.