**COMSATS University Islamabad, Abbottabad Campus

**Department of Computer Science**

**Spring 2023**

Class: BSE 6A and 6B Subject: Software Design and Architecture

**Assignment 3**

**Question:**

Consider an online computer vendor (OCV). The resulting system is called OCVS, in which the last “S” stands for “System.” The business goal of an OCV is to minimize the price of products and increase the satisfaction rate of customers via the latest technology.

An OCV sells computers directly to customers via the Internet. Customers directly specify what they need online. When an order is received, parts are assembled to meet the customer's requirements. Direct selling allows the removal of middlemen and dealers, and hence reduces the cost of product. Just-in-time (JIT) manufacture is used to minimize inventory cost and maximize manufacturing efficiency. Parts are ordered only when required. The whole order processing and product manufacturing process is monitored by a computer system (OCVS), and accurate orders of parts are sent to suppliers every day so that the requirements on parts can be precisely met. The success of OCV relies on the computer system, which bridges the information among all departments and maximizes the efficiency of the whole organization in its entirety. The general requirements of the OCVS are outlined as follows:

1. Requirement 1:

A web portal is provided to customers to place orders. An order will be highly customized where a customer can set the configuration of products step-by-step. Customers will check out directly via the shopping cart or save the shopping cart for later use. Credit cards are the only acceptable payment method. The web portal will serve 10,000 customers simultaneously.

2. Requirement 2: A subsystem is provided to product designers. When a product is released, the designer will input the basic configuration of the product into OCVS. A design will also specify the configuration process of the product. When the specification of a new product is done, the corresponding web pages should be automatically generated in OCVS. Inventory and the subsystem for assembly lines will also incorporate the information immediately.

3. Requirement 3: A subsystem is to assist assembly lines. Each worker on an assembly line is equipped with a computer system that describes in detail the job that the worker must perform.

4. Requirement 4: An automatic inventory management subsystem is developed to track the inventory. An automatic scheduler reports the estimated number of parts required every day. The reports, if approved by business managers, are converted to parts orders to suppliers.

5. Requirement 5: The OCVS should bridge information among all departments to maximize organizational efficiency. The departments involved include order processing, manufacturing, and shipping, product design, and business strategy.

6. Requirement 6:

The required quality attributes of OCVS include: • expandability, so that new products (and their configuration process) will be easily added into the system; modifiability, to allow for modifications of internal representation of products and configuration processes over the time, since the business rules (e.g., parts usage prediction), product web pages, and configuration process will go through frequent changes; • availability and reliability, especially for the modules that interact with customers and the manufacture assembly lines; and • time efficiency, for all modules to cope with the requirement of producing one million PCs per year. Peak time requirement of its customer web portal is to support 10,000 customers simultaneously at any given time.

**Task Required for Assignment**

The task required for the assignment includes to consider at least three potential design candidates for the architecture of the system. Draw a table and justify the most appropriate architecture for this application with reasons.

The next task is to construct a feasible architecture design blueprint of OCVS. Follow a top-down strategy: provide the overall architecture design first and then decompose system into components, where the design of each component is furnished

**Deadline: 3rd July 2023**