

1. Choice Questions (單選;10%)

- (1). Which of the following is NOT true concerning use case modeling?
- A) is an approach that facilitates user-centered development
 - B) has its roots in process modeling
 - C) provides a starting point for the identification of data objects or entities
 - D) is a tool for requirements traceability
- (2). A problem solving technique that decomposes a system into its component parts while focusing on the business problem independent of technology is:
- A) systems design B) cause-and-effect analysis C) systems analysis
 - D) joint application design (JAD) E) none of these
- (3). A description of activities and services that a system must provide is
- A) functional requirement B) non-functional requirement C) prototype
 - D) physical requirement E) none of these
- (4). Which kind of feasibility asks how well the proposed system satisfies the identified system requirements?
- A) legal feasibility B) technical feasibility C) schedule feasibility
 - D) cultural or political feasibility E) operational feasibility
- (5). What is a design pattern?
- A) the obligation that an object has to provide a service when requested
 - B) a set of related, interacting objects that provide a set of services.
 - C) a group of objects packaged together.
 - D) a common solution to a given problem in a given context.

2. Below is a subset of relations from **COMPANY** schema. The keys have been underlined.

EMPLOYEE(FNAME, LNAME, ESSN, BDATE, ADDRESS, SEX, SALARY, SUPERSSN, DNO)

DEPARTMENT(DNAME, DNUMBER, MGRSSN, MGRSTARTDATE)

WORKS_ON(ESSN, PNUMBER, HOURS)

PROJECT(PNAME, PNUMBER, PLOCATION, DNUM)

(6%) Express the following Query in SQL statement by using NOT EXISTS.

“Retrieve the name of each employee who does not work on any projects.”

3. (9%) Consider the universal relation $R = \{A, B, C, D, E, F, G, H, I, J, K\}$ and the set of functional dependencies $F = \{ \{A, B\} \rightarrow \{C, F\}, \{B\} \rightarrow \{D, E\}, \{A\} \rightarrow \{G\}, \{G\} \rightarrow \{H, I\}, \{E\} \rightarrow \{J, K\} \}$. **Decompose R into 2NF, then 3NF relations. You need to clearly show the results (tables) and the keys of the tables after the decompositions.**

