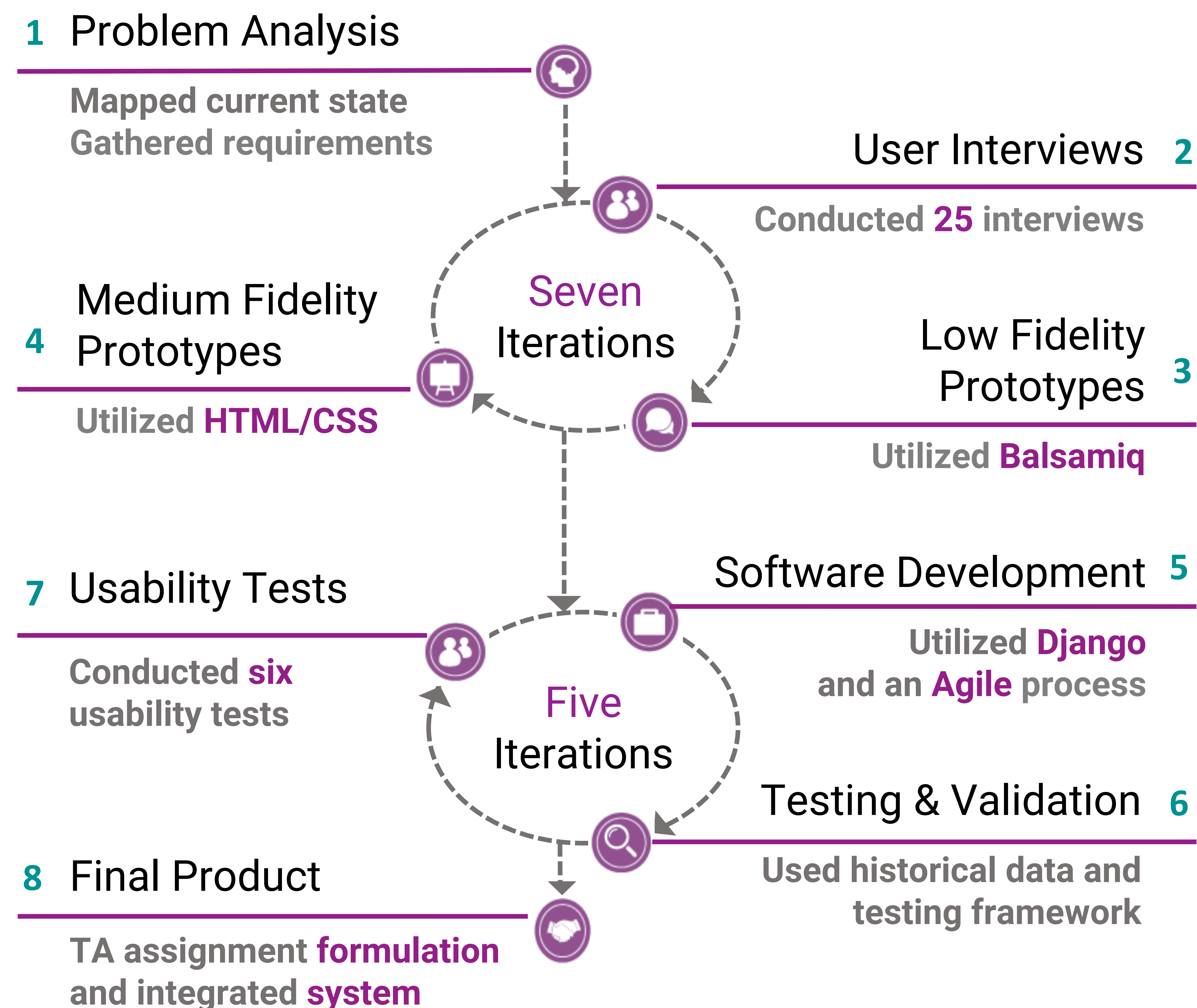


## PROBLEM

Three times every year, the department of Management Sciences relies on **five systems** and **four people** to complete the teaching assistant (TA) assignment process.

The result is an error prone and labour intensive system that requires large amounts of rework and overproduction.

## APPROACH

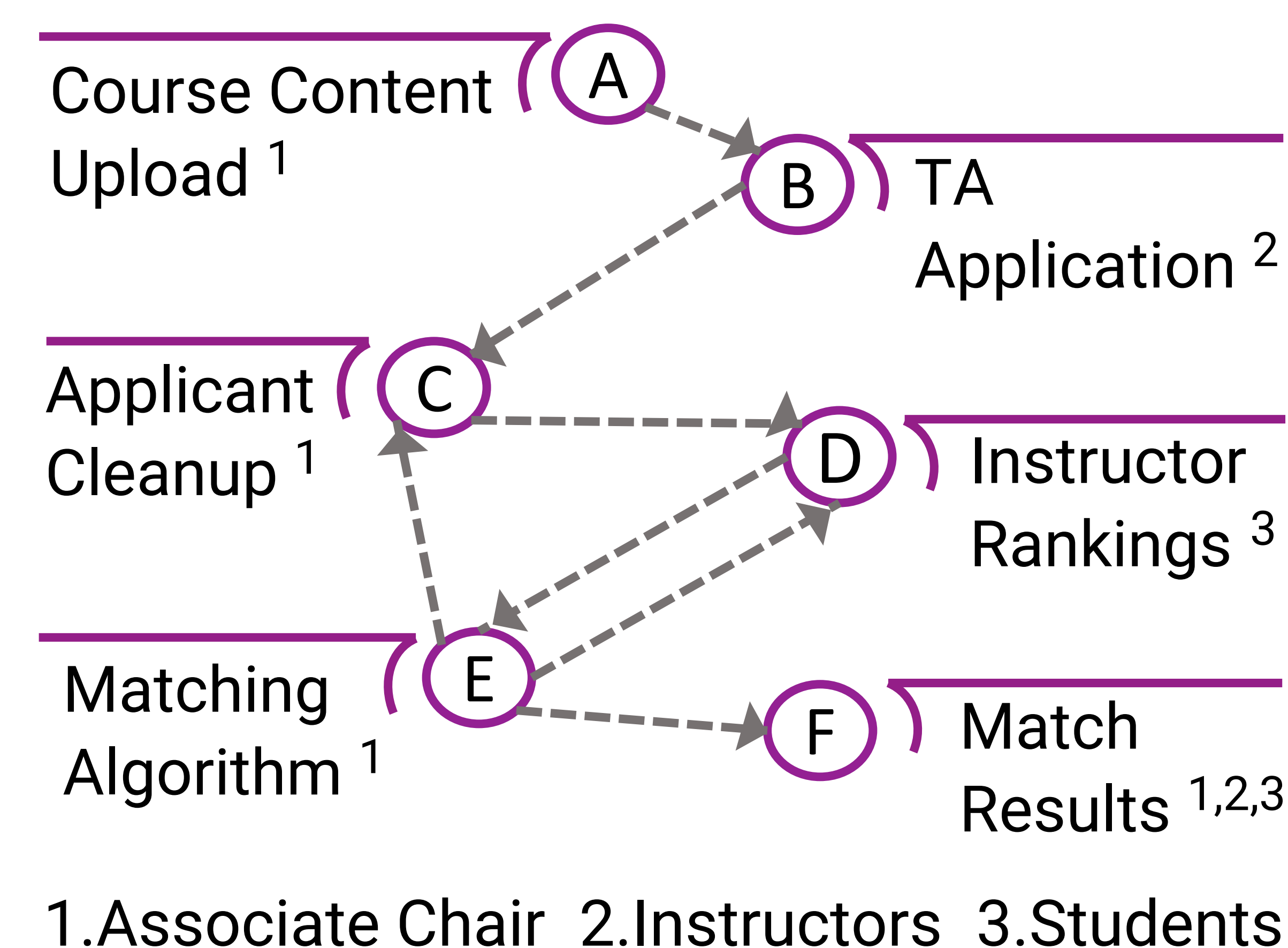


## OBJECTIVES

- Develop an end-to-end **software system** to streamline the TA assignment process
- Formulate a multi-objective **optimization problem** to assign more, high-quality graduate students to TA placements

## SOLUTION

### System Diagram



### Formulation

Maximize **coverage** and **quality** by assigning students  $i$  to courses  $j$

$$\text{Max } \underbrace{\sum_i \sum_j X_{ij}}_{\text{Maximize the number of placements, } X_{ij}} - \underbrace{\beta (\sum_i \sum_j X_{ij} R_{ij})}_{\text{Minimize the poor quality penalty, } R_{ij}}$$

Maximize the number of placements,  $X_{ij}$

Minimize the poor quality penalty,  $R_{ij}$

$\beta$  - Tradeoff between quality and coverage, based on user's utility

s.t. Feasibility constraints

## OUTCOME

- One modular system** replaced five systems and two people
- Tests of historical data from the past seven terms resulted in better **coverage** and/or **quality** scores for TA assignments

*"This is a true transformation of what used to be a paper system to a computer system"* – **Current Associate Chair**