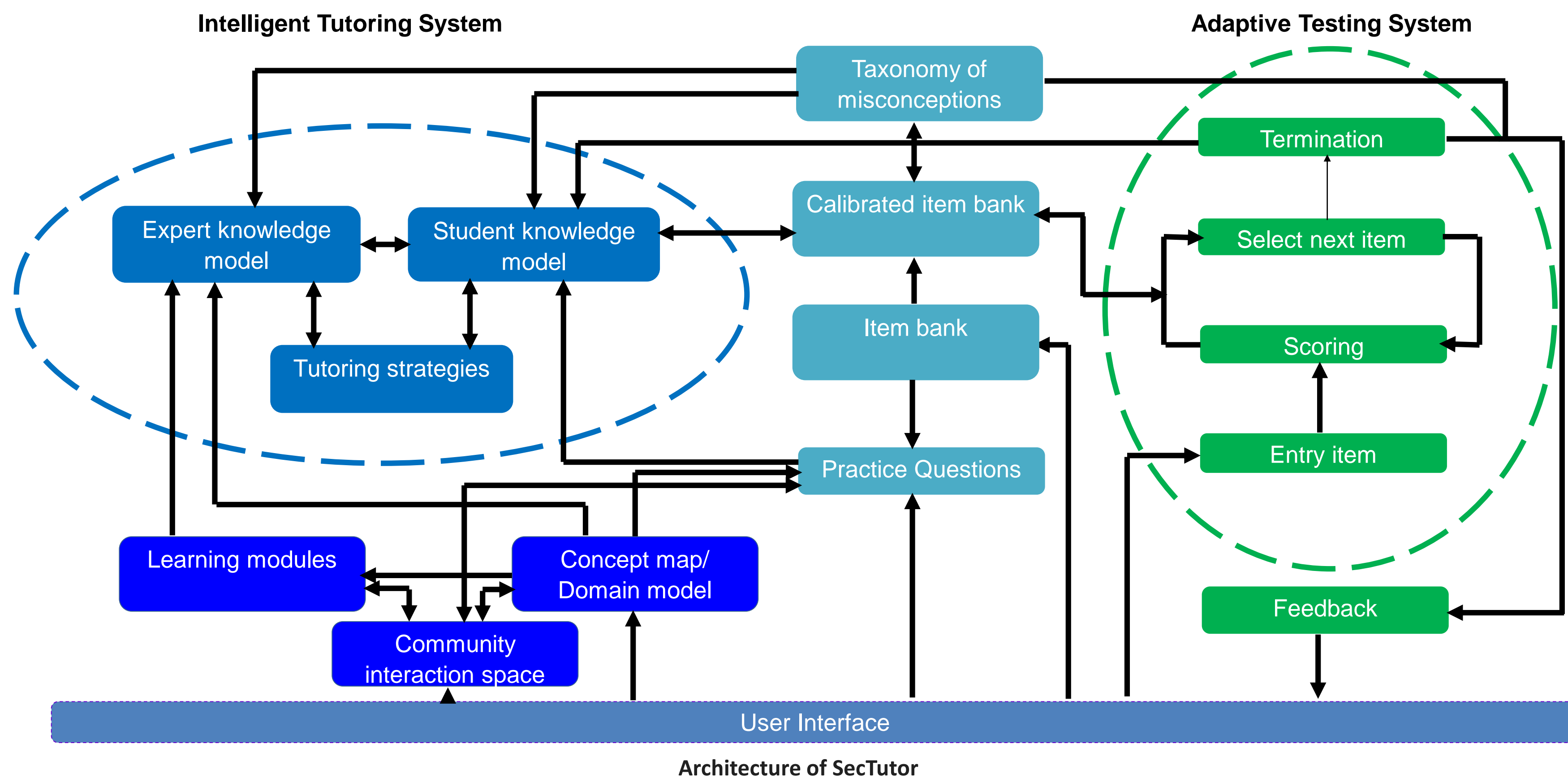


An Assessment Driven Approach to Self-Directed Learning in Secure Programming (SecTutor)

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SecTutor – A Multi-Purpose Training and Testing System for Secure Programming

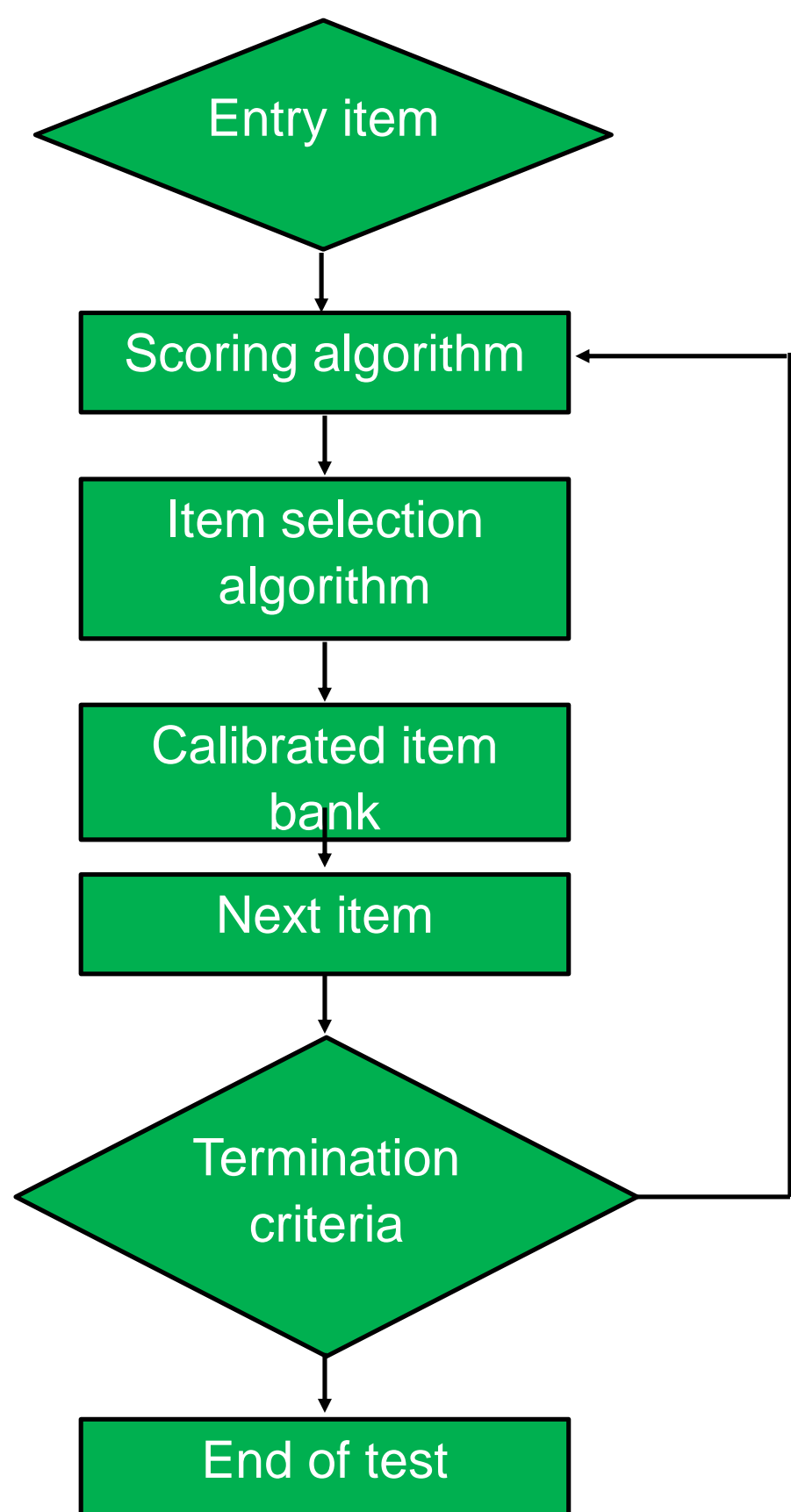


Problem

- Failure to practice secure/robust programming is a challenge in cybersecurity
- Need means for students to practice secure programming outside class and across curriculum

Scientific Impact

- Uses the principles of self-directed learning to contribute to the evolution of personalized learning by creating a system that integrates assessment, customized learning, and giving/receiving peer instruction



Flowchart of computerized adaptive test

Project Goals

To design, build, and assess SecTutor – an online learning tool for secure programming that allows the learner to pursue knowledge at their own pace based on assessments that identify and structure education based on the learner's current level of understanding

Goal will be accomplished through four steps:

- 1) constructing the adaptive test based on rigorously designed concept inventory
- 2) constructing the intelligent tutorial system
- 3) integrating the learning analytics
- 4) testing the system

Broader Impact:

Integrates a concept inventory and learning analytics that allow:

- Instructors to diagnose student misconceptions, identify areas of concern, recommend resources to address them, and track improvements
- Instructors to contribute questions to item bank and get assessment of question quality

Broader Impact:

- Creates a community of practice in secure programming where students can learn from the tool, each other, and experts
- Entry into secure programming at multiple points depending on expertise of the learner

Steps in the development of a computer adaptive test

Step	Stage	Process
Step 1	Feasibility and planning study	Case evaluation
Step 1	Develop item bank	Create a pool of items
Step 2	Pretest and calibrate item bank	Test items with a wide subject pool
Step 3	Determine specifications	Simulations
Step 4	Test CAT	Test CAT results against other assessments

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