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|  | **COMPUTATIONAL CREATIVITY** |
| This work is supported in part by the National Science Foundation under Grants 1122956 (NSF TUES Project), DUE-1431874 (NSF IUSE Project), and a University of Nebraska Pathways to Interdisciplinary Research Center (PIRC) grant | Computational thinking and creative thinking are complementary skills that when blended together become *computational creativity*, enhancing learning and application of both. Our **long-term vision** is to address the growing need for computationally savvy, creative thinkers and problem solvers by incorporating *computational creativity* into the undergraduate CS curriculum to reach both CS majors and other students in STEM and non-STEM fields. A suite of Computational Creativity Exercises (CCEs) was created through a TUES grant. Evaluation found that students who completed the exercises had higher course grades and better learning of CS content. **Specific aims** are to produce a final suite of validated, high quality CCEs and a Computational Creativity undergraduate course, and to conduct rigorous research to understand for *whom and under what conditions* theCCEs are most efficacious, *why* the CCEs are effective by studying students’ collaborative interactions and learning processes, and *how* the CCEs impact students’ enrollment and retention in CS and STEM courses. |
| **Project website** <http://cse.unl.edu/agents/ic2think>**K-12 versions available on Google’s Exploring Computational Thinking website** <https://www.google.com/edu/computational-thinking/>**Versions also available on Ensemble’s Computing Portal** <http://www.computingportal.org/> (search key: IC2THINK)**E-mail**lksoh@cse.unl.edu eingraham2@unl.edu dshell2@unl.edu\\cse-profile\Redirect\lksoh\Desktop\nsf4c.jpgUNL-transparent | **Exercises** Everyday Object | Identify an “everyday” object (such as nail clippers, a paper clip, a Scotch tape) and describe the object in terms of its inputs and outputs and functionalities (*K-12 version: Describing an Everyday Object*). Cipher | Devise a three-step encoding scheme to transfer the alphabet letters into digits and encode questions for other teams to compete to decode (*K-12 version: Ciphering a Sentence*). Storytelling | Each team member develops a chapter (about 100 words) independently in week 1 and team members work to resolve all conflicts or inconsistencies in week 2 (*K-12 version: Writing a Story*). Exploring |Explore sensory stimuli at a particular site (sounds, sights, smell, etc.) and document observations (*K-12 version: Exploring your Environment*). Simile | Pose “simile” descriptions and participate in team-to-team Q&As to solicit guesses and descriptions relevant to a particular object (*K-12 version: Guessing Game*). Machine Testing | Devise ways to test a black-box mysterious machine without causing harm to humans while attempting to reveal the functionalities of the machine (*K-12 version: Machine Testing*). Calendar | Build a calendar for a planet with two suns, and four different cultural groups with different resource constraints and industrial needs. Pathfinding I | Create a step-by-step instruction on drawing lines to create a quilt pattern on a *n* x *n* grid and identify similar structures in other teams’ quilt patterns. Pathfinding II | Use rotation, reflection, and loops to generate a more complex quilt pattern based on simpler base pattern. Marble Maze I | Each team member creates a sub-structure allowing a marble to travel at least for n seconds in week 1 and the team puts all sub-structures together to make a super-structure. Marble Maze II | Teams are broken up and now must adapt their own sub-structure to work with other sub-structures in their new teams. |