Additive Manufacturing Technology

CHAIR: Cameron Collins

CO-CHAIR: Rod Murphy

CONTEST DATE: April 25, 2019

CONTEST LOCATION: Hutchinson Fairgrounds, Domestic Arts Building

CONTEST TIME: 8:00 am

PURPOSE: To evaluate each team's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of Digital and Additive Manufacturing. Additive Manufacturing embraces a wide range of materials and derivative processes building parts suitable for end-use service. The virtually unlimited design freedom enabled by additive manufacturing allows the creation of shapes and the integration of feature and function that previously required subassemblies.
Employment opportunities for creative individuals are growing while industry adopts AM methods. Ready access to workstations and service providers make the Internet a growing marketplace for public AM gadgets.

ELIGIBILITY: Team of two. Open to a team of two active SkillsUSA members enrolled in programs using 3-D imaging and animation as an occupational objective.

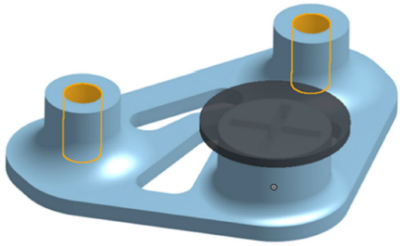
CLOTHING REQUIREMENT: Unless the contest chair says otherwise, students are required to wear the Official SkillsUSA Kansas T-shirt and blue jeans (no tares, holes, or bagginess) clean and neat with appropriate shoes for contest or Official SkillsUSA white polo shirt with black dress slacks, black socks and black leather shoes.

Official SkillsUSA white polo attire

SkillsUSA 2019 Additive Manufacturing State Challenge

Quarter Query - Heads to Tails

Welcome to the "Quarter Query" challenge! The task at hand is to design and use a device made of only 3D printed parts to flip an un-modified U.S. quarter (provided at the competition location) from heads to tales.



"What's the catch?" you say. Well, there are four, and here they are:

1. The device may only be operated by a single, unbent finger. Note: the device may not attach to the finger in any way.

2. The device must remain in contact with at least one Connection Point (orange in the diagram) at all times.

3. The quarter will begin heads-up on the Coin Pedestal (X mark) and must finish tails-up anywhere on the flat surface provided.

4. The device must follow these 3D printing specs. Measured in GrabCAD Print:
    - Prints in less than 2 hours
    - Has a build volume of no greater than 2x2x2 in
    - Uses no more than 5 in^3 of model material
    - Uses no more than 2 in^3 of support material

Sound impossible?

Here's some help: you may use one rubber band in your design. The rubber band that you must use in testing will be provided to you at the competition, but if you want to practice ahead of time, this is the model that will be provided. (Amazon Link)
The competition rig will be fixed to a large flat surface, and its file can be found here https://grabcad.com/library/2019-testing-rig-1

2019 KANSAS STATE CHAMPIONSHIPS (KSC) CONTEST UPDATE

Contest Criteria

Prior to contest day:

Students should submit designs by April 10th to:

support@depcollc.com

On contest day, students must submit:

1. Engineering Notebook (Engineering notebook guidelines below)
2. 3D printed design files
3. Printed part (Provided by contest chair day of contest)
4. Presentation of design

1. Engineering Notebook should:
   - Be clearly labeled with contestant name(s), date and page # on each page
   - Begin with a problem statement
   - Include discovery and documentation of approach to solve problem
   - Include sketched design concepts with critical features labeled
   - Critical dimensions clearly labeled in design sketch
   - Considerations for designing for FDM distinctly addressed (i.e. part strength, part orientation) especially including any expected risks during printing
   - Design decisions and alternatives are documented and evaluated thoughtfully

2. 3D Printed Design - Students must create a design that:
   - Prints in less than *2 hours*
   - With a build volume of no greater than *2X2X2in*.
   - Using no more than 5 in^3 of build material
   - Using no more than 2 in^3 amount* of support material

*Students must submit CMB files to be printed via GrabCAD Workbench no later than 11:59 *CST* on April 10th. Final prints will be delivered day of contest so that students can test, assemble/modify and be evaluated.*

3. Presentation Criteria
   - The team clearly describes their understanding of the problem to be solved.
   - Design Process: good design logic is used for key design choices was intentional and well-communicated
   - The presentation is professional and well-rehearsed
   - Practical evaluation: Part functions way team intended in 3 out of 3 tests.