Research Experiences for Teachers
Enhancing Teacher Knowledge and Skills in Modern Manufacturing

TITLE: 3 Dimensional (3D) CPU/CPU Slot & Memory/Memory Slot

By: Alfonse Hubbard

Supported by: Anthony Watkins

Title: Principal

School and address: Benjamin O. Davis High School 12525 Ella Blvd, Houston, TX 77067

Date: 7/15/2022

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UNIVERSITY

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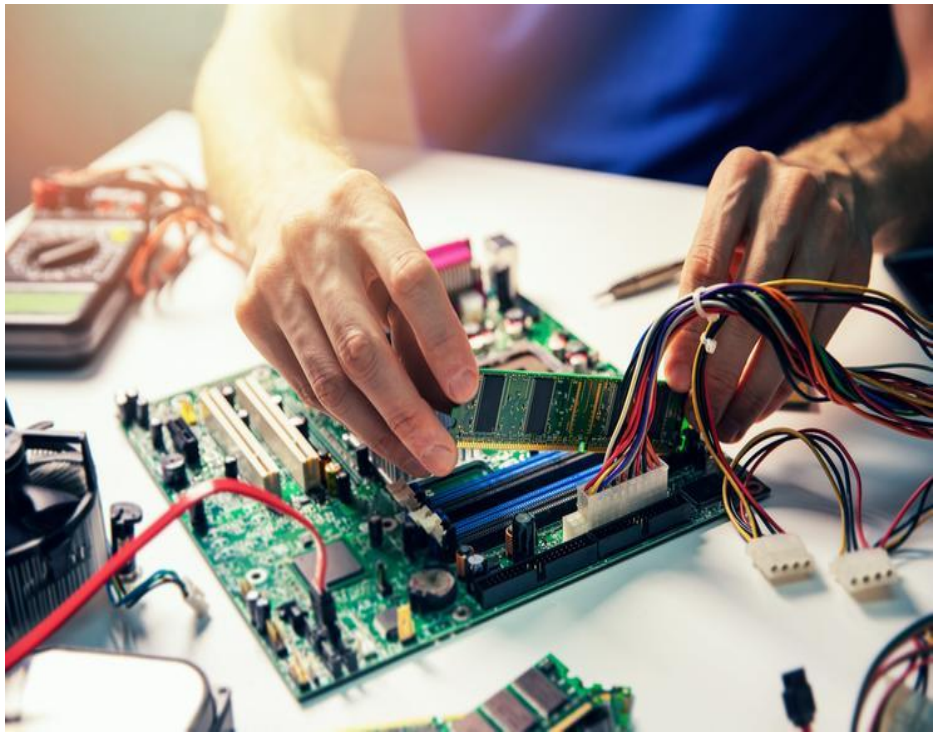
Issue and Motivation

As a lab exercise, the Central Processing Unit (CPU) and the memory card are some of the most volatile components within a computer. They are subject to statics electricity, and user error during the installation as well as the uninstall process. The issue, the school have a limited supplies of available computer machines, usually 15, as well as computer components for the students to practice with. There is a directed correlation with the success rate of the students passing either the IT Fundamental Exam and/or the A+ Certification Exam. Currently, I have over 100+ students enrolled in my Computer Engineering classes, preference is given to the 3rd year students. Using a 3D Printer, I can create several non electronic models of CPU/CPU Slots, Memory/Memory Card Slot and several Quality Assurance Test Stations.

CPU and Memory



Davis H. S. Computer Engineering Students

Implementation

Block Schedule: 1 hour and 30 minutes

CPU/Memory removal and installation

Computer Maintenance: 4.5 hours - 1st Year students - Basic

Computer Technician: 7.5 hours - 2nd Year students -Intermediate

Computer Practicum: 9.0 hours - 3rd Year students - Advance

1) Equipment & budget: existing and new equipment. Funding request

MP Cadet 3D Printer

Product # 40108 UPC # 889028142646

$199.99

Funding request:

- We are requesting funding for 1 - 3D Printer; we will add additional printers, up to 5 at a later date.

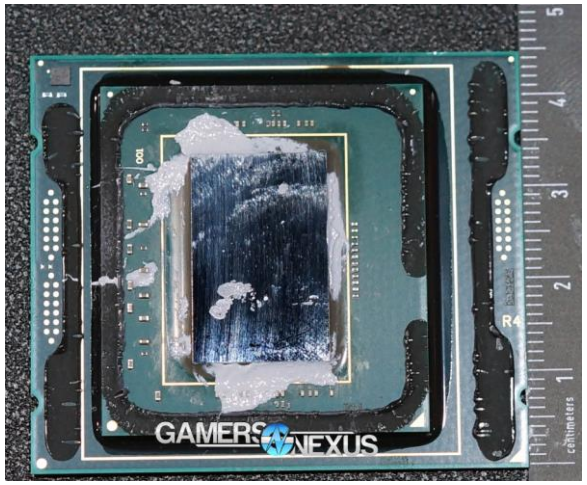
- The printers will be used to print non electronic computer parts for lab training i.e cpu/cpu slot, memory/memory slot, go/no go rigs.

- The student will use Fusion 360 to create non-electronic model of computer components. No cost.

www.walmart.com/ip/Monoprice-MP-Cadet-3D-Printer-Full-Auto-Leveling-Print-Via-Wi-Fi-Great-for-Childrer Classroom/581284729

CPU Scale - Dimension

The 3D image of the non- electrical CPU and CPU Slots are less than 2 inches on each sides, exact specification for training purposes are not required. The pin 1 location on the CPU can be color coded for training purpose. An alternative to a non-electronic 3D model image of a computer component is a spare parts or used computer. These items are generally more expenses than a 3D model



4.5 X 4.5 X .25 CM

Pin 1

https://www.gamersnexus.net/news-pc/2943-intel-i9-7900x-die-size-cpu-size

This section provides demographic information about Benjamin O. Davis High School - ALDINE ISD

School and Student Information

This section provides demographic information about DAVIS H S ALDINE, including attendance rates; enrollment percentages for various student groups; student mobility rates; and class size averages at the campus, district, and state level, where applicable.

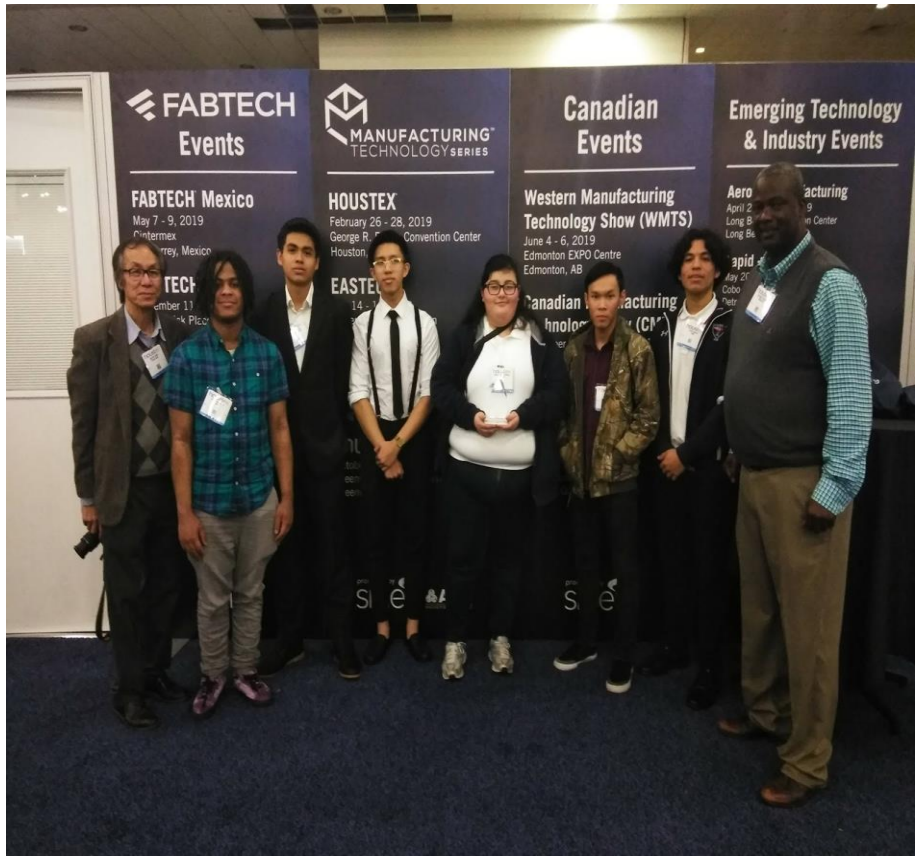
	Campus	District	State
Attendance Rate (2017-18)	90.0%	94.0%	95.4%
Enrollment by Race/Ethnicity			
African American	31.7%	22.7%	12.6%
Hispanic	61.4%	72.7%	52.6%
White	2.5%	2.4%	27.4%
American Indian	0.2%	0.3%	0.4%
Asian	3.1%	1.1%	4.5%
Pacific Islander	0.1%	0.2%	0.2%
Two or More Races	1.0%	0.7%	2.4%
Enrollment by Student Group			
Economically Disadvantaged	81.0%	87.2%	60.6%
English Learners	16.8%	34.6%	19.5%
Special Education	7.1%	8.1%	9.6%
Mobility Rate (2017-18)	17.8%	16.2%	15.4%

	Campus	District	State
Class Size Averages by Grade or Subject			
Secondary			
English/Language Arts	16.7	19.6	16.6
Foreign Languages	18.1	21.4	18.9
Mathematics	23.1	22.3	17.8
Science	22.9	24.1	18.9
Social Studies	25.6	24.8	19.3

rptsvr1.tea.texas.gov/cgi/sas/broker?_service=marykay&_program=perfrept.perfmast.sas&cyr=2019&level=campus&search=district&namenum=Aldine+ISD&district=101902&campus=101902012&_debug=0&prgopt=2019%2Fsrc%2Fsrc.sas

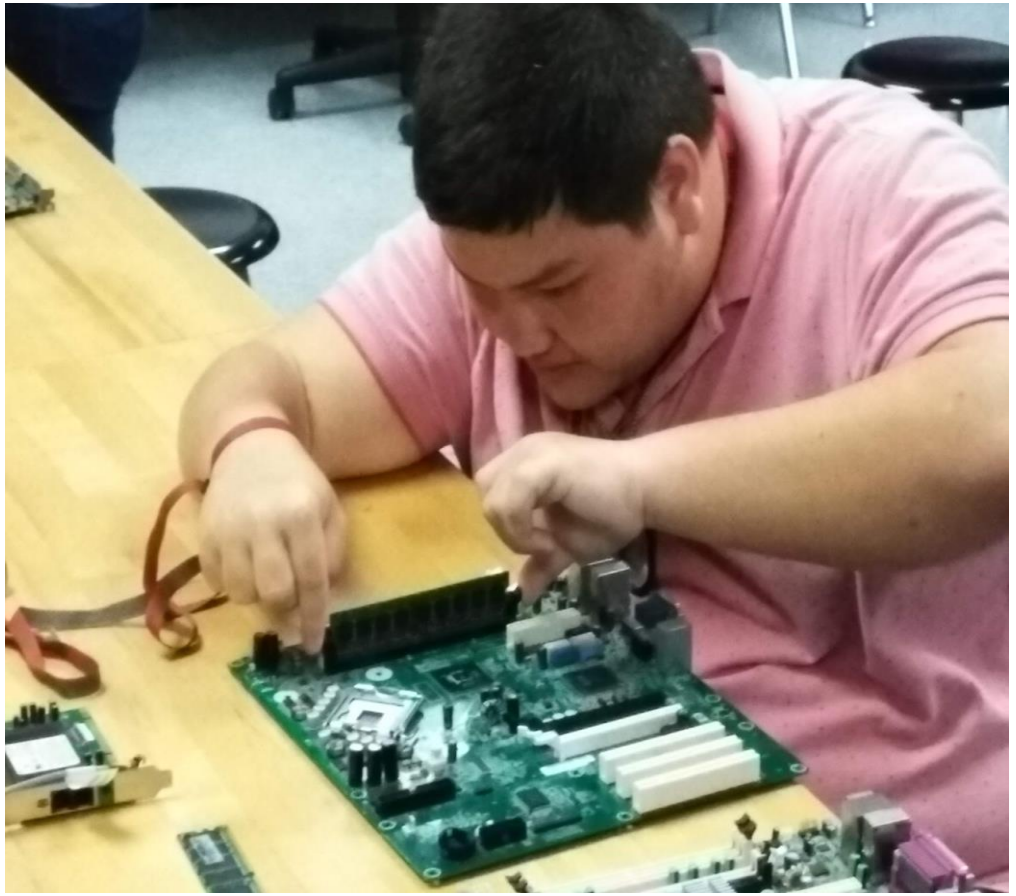
Upcoming events in 2022-23

Houstex Manufacturing Technology - Internships



CTE Goal for 2022-23

College Bound STEM student increase by 20%



1) Description: new thing to add /create in your class activity

I expected to add several non electrical 3D images to my classroom. I hope not only to create 3D images of critical IT related computer components, but to also add other educational related 3D images to my class i.e. the topological view of a Par 3, Par 4 and a Par 5 golf hole.

Quality #	Description	Unit Price ($)	Source
1	3D Non electrical CPU Model	Hatchbox 3D Printer Filament - Yellow 29.99	Walmart
1	3D Non electrical RAM Model	Hatchbox 3D Printer Filament - Blue 29.99	Walmart
1	3D Model of Golf Greens -	Hatchbox 3D Printer Filament - Green 29.99	Walmart
1	Printer	MP Cadet 3D Printer 199.99	Walmart

Total 3D Printer and Filament Cost: $289.96

Summary

The students enrolled in Davis High School Computer Engineering classes have increased significantly. Four years ago, we had only 40 students enrolled in computer engineering courses, today we have over 100+ students enrolled in our computer engineering class.

Having a 3D printer will enable the students to have more hand on experiences with the removal and installation of computers components. It will also mean a 20% increase in students passing the IT Fundamental and A+ Certification Exams.

Total cost for implementation $289.96