Engineering as a Lingua Franca

What is a Lingua Franca?

- Literal translation: 'Frankish Tongue' in Italian.
- First used to refer to the French/Italian-based language developed by Crusaders in the eastern Mediterranean
- "Any of various languages used as common or commercial tongues among peoples of diverse speech" (Merriam-Webster)

The Purpose of Lingua Francas

- Generally used to unify groups of people
  - Utilized in many empires and major trade ports
  - Modern international air traffic control uses English as the common language
  - Until the 18th Century, European scholars spoke Classical Latin as opposed to the less prestigious variety of Latin spoken by German traders (Brittanica)
- Eliminates the language barrier

If you encountered a language barrier with one of the following, which do you think would be the easiest to deal with?

a)Family Member

b)Co-Worker

c)Teacher

d)Significant other

How could you break/work through the barrier?

Interview with Team-member

- Do you find it easier to communicate with English-speaking engineering students through speech or through engineering processes?
  - "If we are talking about a project or assignment, it is quicker for me to communicate by showing my thoughts through math or a diagram. Sometimes it takes a while to think of the correct words I am trying to say, but it is easy to show."
- Can you think of a time where it was easier to use the subject of engineering as a way to communicate rather than verbal language?
  - "When I have to analyze a circuit, we use software called Multisim to calculate values and digitally construct it. When I get stuck, it is very easy to communicate with classmates by showing them my screen and the error based on my circuit. Rather than telling them what connections I made I am able to show them and still get their help."

The Lingua Franca of Engineering

- Breaking the language barrier through:
  - Math/Symbols
  - Simulation/Design Software
  - Conceptual Interpretation

Math

- Math courses such as Calculus, Algebra and Trigonometry are taught across the world. Engineers use these topics everyday.
- Symbols in countries may vary, but the same operations are done.
  - For example: Division in the US is represented as 3/2, where in Latin American countries it is also represented as 3:2. Also, for angles, rather than using ∠ next to a value to show it is an angle being represented, Latin American countries use ^ above the value to represent an angle. (Todos)
- Greek letters to represent specific values are used from country to country

Ω Δ ∑ Ψ

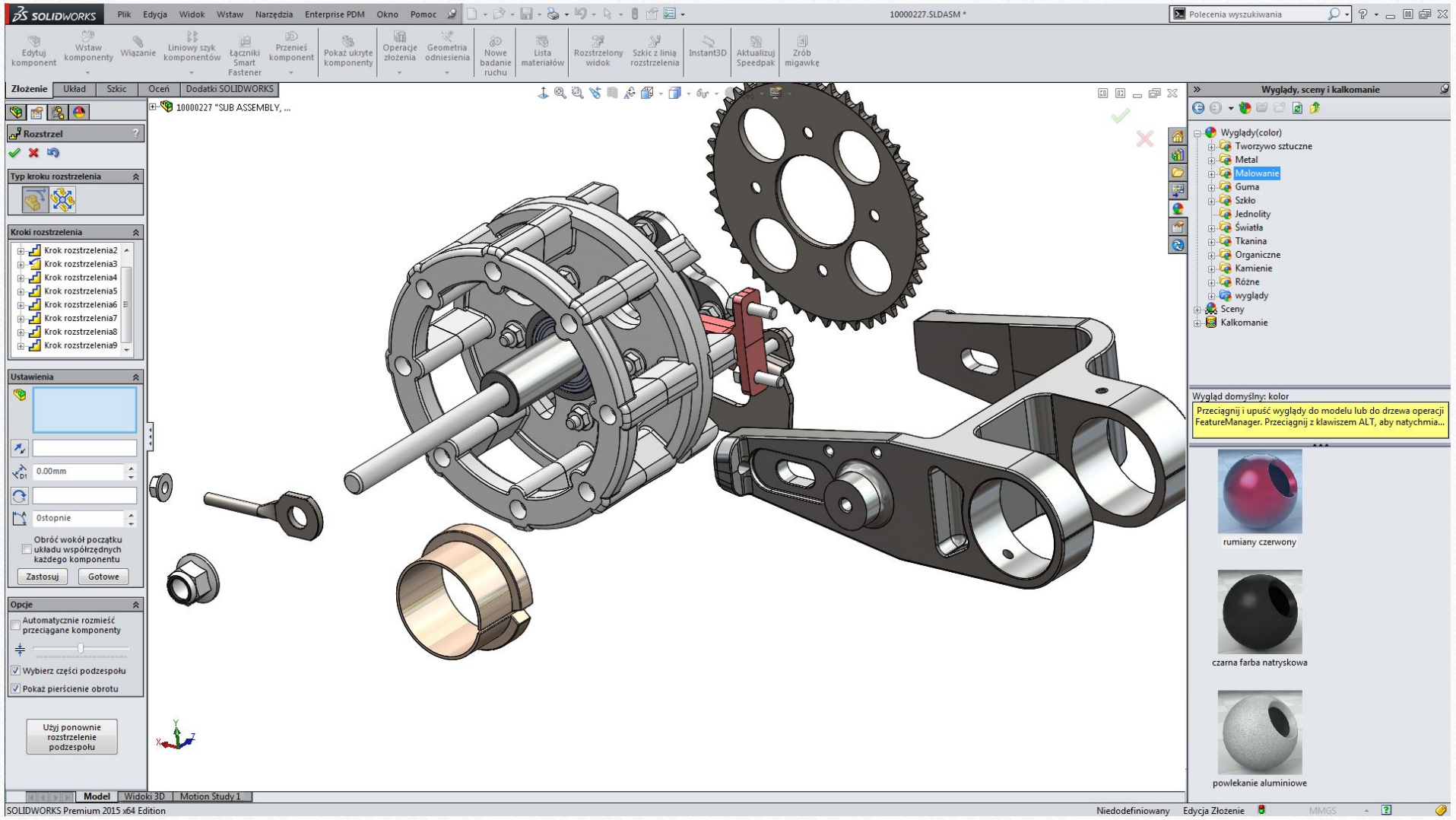
Calculus: Isaac Newton, Englishman and Gottfried Leibniz, German
-First developed the concepts of calculus together.

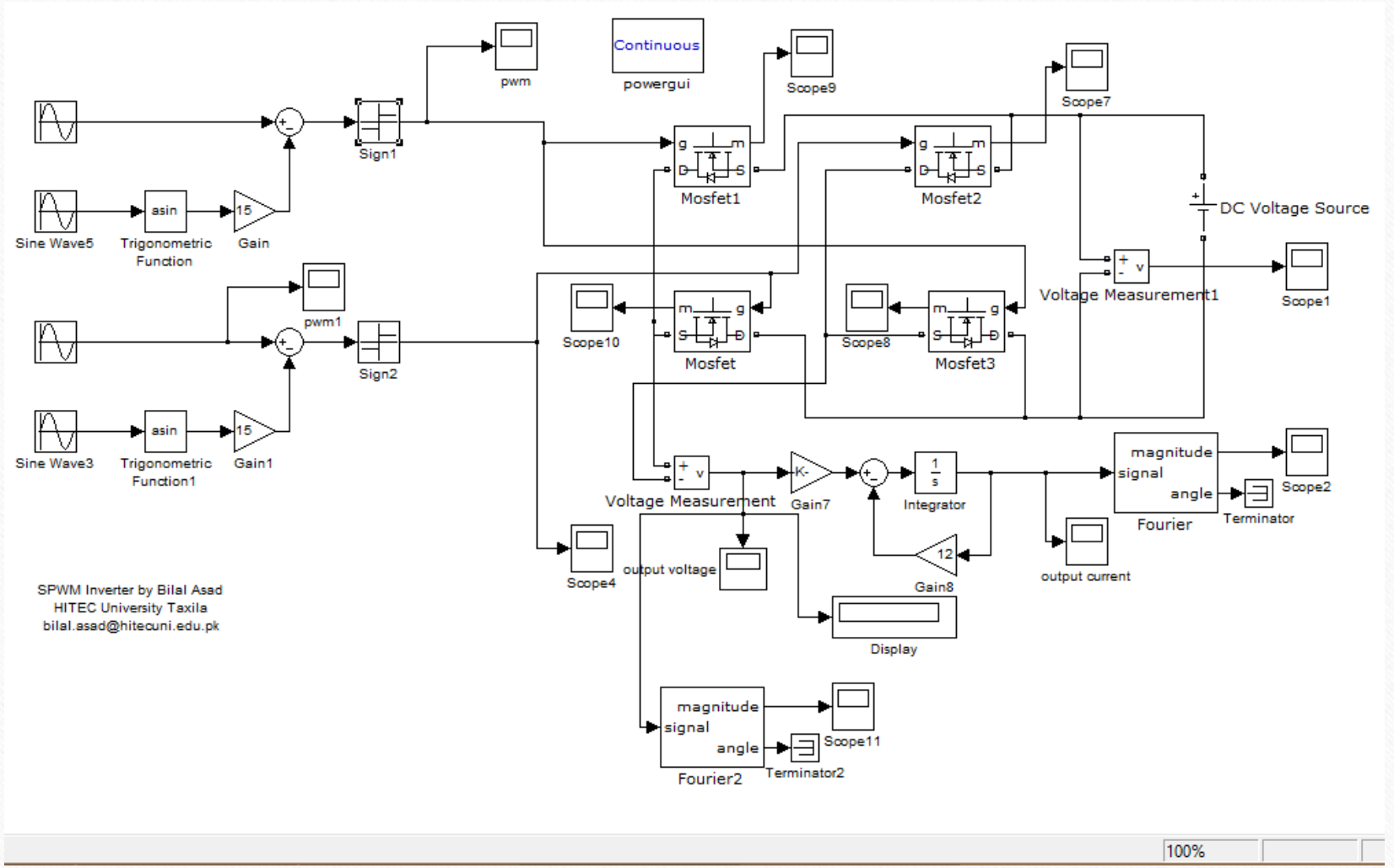
Trigonometry: Hipparchus, Greek Astronomer and Mathematician, Bartolomeo Pitiscus, Polist Theologist
-First utilized by Hipparchus to determine the distance between the stars
-First titled Trigonometry and created a study on the concepts

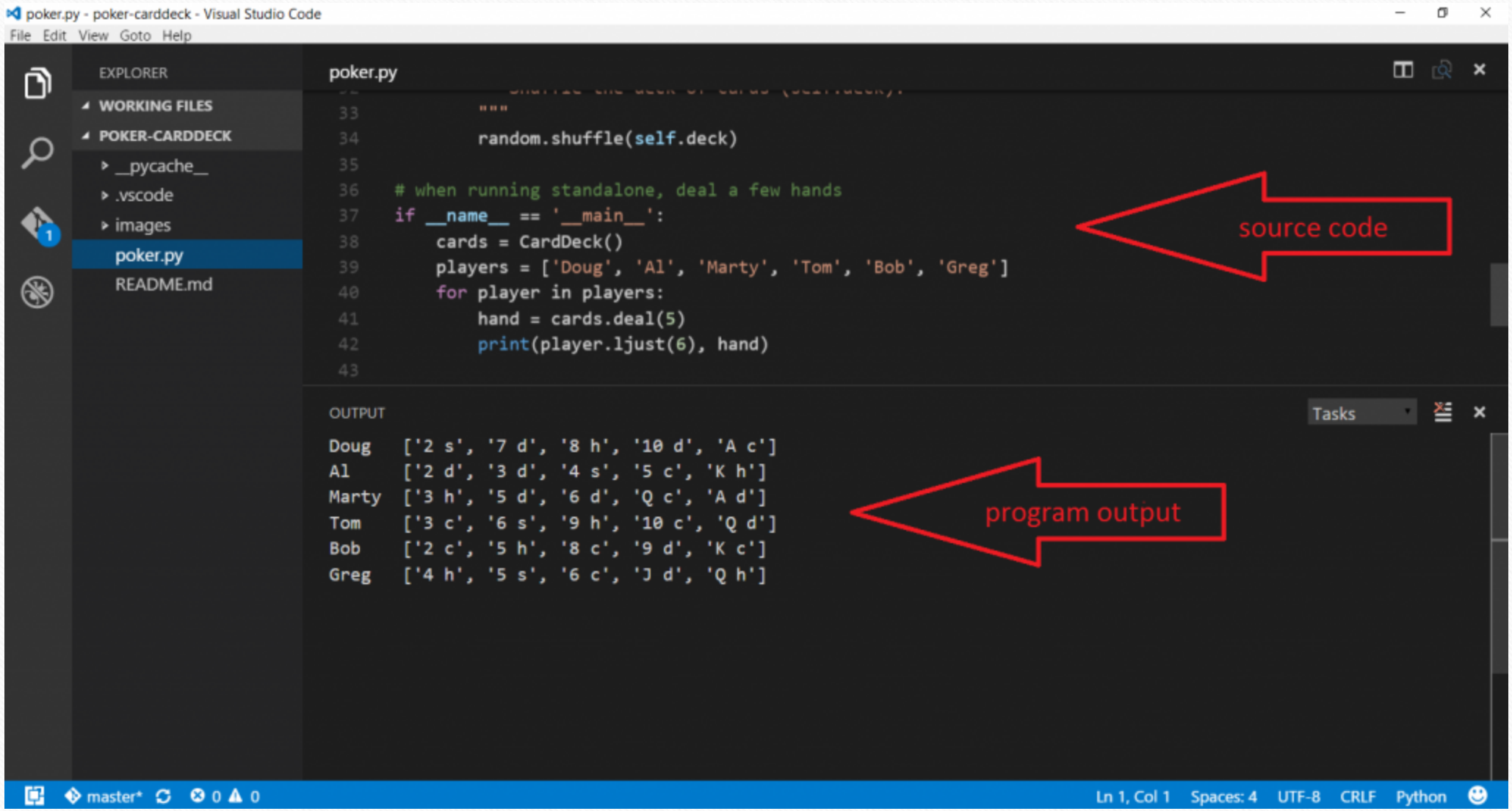
Algebra: Francois Viète, French Mathematician
-First emerged in 16th century Europe by Francois
-Derived from Arabic word, al-jabr, coming from the work of a medieval Persian mathematician named Muḥammad ibn Mūsā al-Khwārizmī, his work titled The Compendious Book on Calculation by Completion and Balancing
-There is Greek algebra, Chinese algebra, Indian algebra, Islamic algebra, European algebra, and Modern algebra, all of which utilized the three stages of algebraic expression, rhetorical, syncopated, and symbolic.

Software

- Solidworks/3-D CAD
  - Visualize models and build parts geometrically.
  - Operation based on visual cues only.
- Simulink/Multisim
  - Construct electrical and mechanical systems visually
  - Analyze via software utilizing math-based operations
- MATLAB
  - Used to solve difficult and overwhelming equations/systems
  - Uses math concepts and structure


SOLIDWORKS
Plik Edycja Widok Wstaw Narzędzia Enterprise PDM Okno Pomoc
10000227.SLDASM *
Polecenia wyszukiwania
Edytuj komponent
Wstaw komponenty
Wiązanie
Liniowy szyk komponentów
Łączniki Smart Fastener
Przenieś komponent
Pokaż ukryte komponenty
Operacje złożenia
Geometria odniesienia
Nowe badanie ruchu
Lista materiałów
Rozstrzelony widok
Szkic z linią rozstrzelenia
Instant3D
Aktualizuj Speedpak
Zrób migawkę
Złożenie
Układ
Szkic
Oceń
Dodatki SOLIDWORKS
Rozstrzel
Typ kroku rozstrzelenia
Kroki rozstrzelenia
Krok rozstrzelenia2
Krok rozstrzelenia3
Krok rozstrzelenia4
Krok rozstrzelenia5
Krok rozstrzelenia6
Krok rozstrzelenia7
Krok rozstrzelenia8
Krok rozstrzelenia9
Ustawienia
0.00mm
0stopnie
Obróć wokół początku układu współrzędnych każdego komponentu
Zastosuj
Gotowe
Opcje
Automatycznie rozmieść przeciągane komponenty
Wybierz części podzespołu
Pokaż pierścienie obrotu
Użyj ponownie rozstrzelenie podzespołu
10000227 "SUB ASSEMBLY, ...
Wyglądy, sceny i kalkomanie
Wyglądy(color)
Tworzywo sztuczne
Metal
Malowanie
Guma
Szkło
Jednolity
Światła
Tkanina
Organiczne
Kamienie
Różne
wyglądy
Sceny
Kalkomanie
Wygląd domyślny: kolor
Przeciągnij i upuść wyglądy do modelu lub do drzewa operacji FeatureManager. Przeciągnij z klawiszem ALT, aby natychmia...
rumiany czerwony
czarna farba natryskowa
powlekanie aluminiowe
Model
Widoki 3D
Motion Study 1
SOLIDWORKS Premium 2015 x64 Edition
Niedodefiniowany
Edycja Złożenie
MMGS


Continuous
powergui
pwm
Scope9
Scope7
Sign1
Mosfet1
Mosfet2
DC Voltage Source
Sine Wave5
asin
Trigonometric Function
15
Gain
Voltage Measurement1
Scope1
pwm1
Scope10
Mosfet
Scope8
Mosfet3
Sign2
Sine Wave3
asin
Trigonometric Function1
15
Gain1
Voltage Measurement
Gain7
1/s
Integrator
magnitude
signal
angle
Fourier
Terminator
Scope2
Scope4
output voltage
12
Gain8
output current
Display
SPWM Inverter by Bilal Asad
HITEC University Taxila
bilal.asad@hitecuni.edu.pk
magnitude
signal
angle
Fourier2
Terminator2
Scope11
100%


poker.py - poker-carddeck - Visual Studio Code
File Edit View Goto Help
EXPLORER
WORKING FILES
POKER-CARDDECK
__pycache__
.vscode
images
poker.py
README.md
poker.py
"""
random.shuffle(self.deck)
# when running standalone, deal a few hands
if __name__ == '__main__':
cards = CardDeck()
players = ['Doug', 'Al', 'Marty', 'Tom', 'Bob', 'Greg']
for player in players:
hand = cards.deal(5)
print(player.ljust(6), hand)
source code
OUTPUT
Tasks
Doug ['2 s', '7 d', '8 h', '10 d', 'A c']
Al ['2 d', '3 d', '4 s', '5 c', 'K h']
Marty ['3 h', '5 d', '6 d', 'Q c', 'A d']
Tom ['3 c', '6 s', '9 h', '10 c', 'Q d']
Bob ['2 c', '5 h', '8 c', '9 d', 'K c']
Greg ['4 h', '5 s', '6 c', 'J d', 'Q h']
program output
master*
0 0
Ln 1, Col 1
Spaces: 4
UTF-8
CRLF
Python

Concepts

- Physics
  - Mathematical representation of the physical world around us
- Structural Analysis
  - Study of effects of loads on physical structures such as buildings, bridges, vehicles, etc.
- Programming
  - Creation of a set of functions to execute computer programs

Conclusion

- In various ways, Engineering can serve as a lingua franca to unify students in order to solve a common problem.
- Although not an actual language, the topic has several aspects that can allow people to communicate ideas and problems non-verbally.
- Mostly through visual cues and physical concepts/observations

Works Cited

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