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| INFORMATICSPRACTICES | |  |
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|  | Practical FileBy: Divyanshu Shekhar | |
|  | XI-Science, P.B.I.CSubmitted To:  Mr. Dheeraj Sir | |

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|  | Python Programming LanguagePython is an object oriented, high-level computer programming language. It is an interpreted and dynamically-typed language. It was created by Guido Van Rossum in February 1991 when he was at Centrum Wiskunde & Informatica (**CWI**) which is a Mathematics & Computer Science Institute in the Netherlands. Python has become popular over the years and is actively used in many educational and professional environments. It can be used for multiple things such as development of applications, websites, artificial intelligence and high-security servers. | |  |
|  | Features  * Object Oriented & Dynamically Typed * Easy to learn syntax * It is cross-platform, meaning it supports many devices such as Windows, Mac, Linux PCs and even smartphones. * It is free and open-source * Comes included with a lot of functionality through its standard library * Has a wide variety of applications  Cons  * Time taken to execute code is slower than some compiled languages * Fewer available libraries * Difficult to convert to other languages |  |  |

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### Q. Write a python program to calculate percentage based on marks of 5 subjects of a student.

### Code:

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| # Program to caculate percentage in exams  # Take input and create variables  subjects = int(input('How many subjects do you have?: '))  scored\_marks = 0  total\_marks = 0  # Enquire marks using loop  for i in range(subjects):      marks = str(input(f'Enter marks in subject {i + 1} in format => Scored/Max [Example: 66/70]: ')).replace(' ', '').split('/')      scored\_marks += float(marks[0])      total\_marks += float(marks[1])  # Calculate percentage and show output  percentage = (scored\_marks / total\_marks) \* 100  print(f'Your percentage is: {round(percentage, 2)}%') |

### Output:

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### Q. Write a program to calculate monthly EMI cost of a product with given price, duration and interest.

### Code:

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| # Program to calculate EMI with amount, duration and interest  # Take inputs  amt = float(input('Enter product\'s full amount: '))  time = int(input("Enter duration of the EMI (in months): "))  intrst = (float(input("Enter interest in %: ").strip().replace('%', '')) / 12) / 100  # Calculate EMI amount  emi = amt \* intrst \* (1 + intrst) \*\* time / ((1 + intrst) \*\* time - 1)  # Show output  print(f'Your EMI should cost you Rs. {round(emi, 2)} per month') |

### Output:

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### Q. Write a program to calculate the area of a triangle using Heron’s Formula.

### Code:

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| # Program to calculate triangle area using heron's formula  # Take input  side1 = float(input("Enter length of 1st side: "))  side2 = float(input("Enter length of 2nd side: "))  side3 = float(input("Enter length of 3rd side: "))  # Calculate area  half\_p = (side1 + side2 + side3) / 2  area = ((half\_p) \* (half\_p - side1) \* (half\_p - side2) \* (half\_p - side3)) \*\* 0.5  # Show output  if area == 0:      print('\nInvalid triangle measurements.') # Tell user if measurements are invalid  else:      print(f"\nArea of this triangle is: {str(area)} square-unit") |

### Output:

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### Q. Write a program to calculate permutations and combinations using their mathematical formulas.

### Code:

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| # Program to find permutations and combinations  n = int(input("Enter total number of objects (n): "))  r = int(input("Enter number of selected objects (r): "))  # Calculate factorials  if (0 <= r) and (r <= n):      n\_factorial = 1      for i in range(1, n+1):          n\_factorial \*= i      r\_factorial = 1      for i in range(1, r+1):          r\_factorial \*= i      nr\_factorial = 1      for i in range(1, (n-r)+1):          nr\_factorial \*= i      # Calculate permutations and combinations      permu = n\_factorial / nr\_factorial      combi = n\_factorial / (r\_factorial \* nr\_factorial)      # Show output      print(f"Permutations: {permu}\nCombinations: {combi}")  else:      print("Invalid inputs. Correct formula is: 0 <= r <= n") |

### Output:

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### Q. Write a program to calculate the sale price of a product with given price and discount in %

### Code:

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| # Program to calculate sale price of a product after discount  initial\_price = float(input("Enter price of the products in Rupees: "))  discount = float(input("Enter discount in percentage: ").strip().replace("%", ''))  # Calculate discount  perc = (initial\_price \* discount) / 100  final\_price = initial\_price - perc  # Show final price  print(f"The final price of the product is: Rs. {final\_price}") |

### Output:

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### Q. Write a program to calculate Simple Interest and Compound Interest with given Principle, Rate and Time.

### Code:

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| # Program to calculate compound interest and simple interest  # Take input  p = float(input("Enter the principle amount: "))  r = float(input("Enter rate (% per annum): "))  t = float(input("Enter time (years): "))  # Calculate simple interest  si = (p \* r \* t) / 100  # Calculate compound interest  ci = (p \* (1 + r / 100) \*\* t) - p  print(f'Simple Interest: {si}\nCompound Interest: {ci}') |

### Output:

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### Q. Write a program to calculate the sum of squares of first X natural numbers.

### Code:

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| # Program to calculate the sum of squares of first X natural numbers  # Take input  x = int(input("Enter a positive integer: "))  # Calculate  if x < 1:      print("Invalid input. Please enter a positive integer.")  else:      total = 0      for i in range(1, x + 1):          total += i \*\* 2      # Show output      print(f"The sum of the squares of the first {x} natural numbers is: {total}") |

### Output:

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### Q. Write a program to print the multiplication table of any number

### Code:

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| # Program to print tables of any input number  # Take input  num = float(input("Which number's table do you want to know?: "))  times = int(input("How many table multiplications do you want to print?: "))  for i in range(times):      print(f'{num} x {i + 1} = {num \* (i + 1)}') |

### Output:

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### Q. Write a program to print the area of triangle using base/height formula

### Code:

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| # Program to calculate area of a triangle using both Heron's formula and Base/Height formula  # Take input  base = float(input("Enter base of triangle: "))  height = float(input("Enter height of triangle: "))  # Calculate and output area  area = (base \* height) / 2  print(f"\nArea of this triangle is: {str(area)} square-unit") |

### Output:

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### Q. Write a program to print the trigonometric values of a right-angled triangle

### Code:

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| # Program to calculate several values of a triangle  p = float(input("Enter the perpendicular length of triangle: "))  b = float(input("Enter the base length of triangle: "))  h = float(input("Enter the hypotenuse of triangle: "))  if (p <= 0) or (h <= 0) or (b <= 0):      output = "Invalid Input."  else:      # Calculate values      peri = p + b + h      half\_p = (p + b + h) / 2 # Half perimeter for area      area = ((half\_p) \* (half\_p - p) \* (half\_p - b) \* (half\_p - h)) \*\* 0.5 # Area      if area == 0.0:          output = "Invalid triangle measurements."      else:          output = f"""  Mathematical values of this triangle are:  Area = {round(area, 2)} square-unit  Perimeter = {peri} unit  Trigonometric Values of this triangle are:  Sin = {p}/{h} = {p/h}  Cos = {b}/{h} = {b/h}  Tan = {p}/{b} = {p/b}  Cosec = {h}/{p} = {h/p}  Sec = {h}/{b} = {h/b}  Cot = {b}/{p} = {b/p}  """    print(output) |

### Output:

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| THANK YOU |
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