Lab #5

Programming and Algorithms

Please complete all of the following questions:

1. The following Python program prints out the number 2 to 100 and indicates whether they are prime numbers or not.

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| # PROGRAM CheckFirst100Primes:  for a in range(2, 101):  b = a - 1  IsPrime = True  while b != 1:  # DO  if a % b == 0:  # THEN  IsPrime = False  # ENDIF;  b = b - 1  # ENDWHILE;  if IsPrime == True:  # THEN  print(a, "is a prime number")  else:  print(a, "is not a prime number")  # ENDIF;  # ENDFOR  # END. |

Modify the above program to just print out the prime numbers as follows:

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| 2 is a prime number  3 is a prime number  5 is a prime number  7 is a prime number  11 is a prime number  13 is a prime number  17 is a prime number  19 is a prime number  23 is a prime number  29 is a prime number  31 is a prime number  37 is a prime number  41 is a prime number  43 is a prime number  47 is a prime number  53 is a prime number  59 is a prime number  61 is a prime number  67 is a prime number  71 is a prime number  73 is a prime number  79 is a prime number  83 is a prime number  89 is a prime number  97 is a prime number |

1. Explain in 350-500 words what the following Python program does:

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| # PROGRAM PrimeProgram:  TwinValue = 1  for a in range(2, 1001):  b = a - 1  IsPrime = True  while b != 1:  # DO  if a % b == 0:  # THEN  IsPrime = False  # ENDIF;  b = b - 1  # ENDWHILE;  if IsPrime == True:  # THEN  if (a == TwinValue + 2):  print(TwinValue, a)  TwinValue = a  # ENDIF;  # ENDFOR  # END. |

1. Write a Python program to print out the first 25 Fibonacci numbers.
2. Write a Python program to print out the first 25 Fibonacci numbers, indicating which are prime numbers and which are not, as follows:

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| 1 is a prime number  1 is a prime number  2 is a prime number  3 is a prime number  5 is a prime number  8 is not a prime number  13 is a prime number  21 is not a prime number  34 is not a prime number  55 is not a prime number  89 is a prime number  144 is not a prime number  233 is a prime number  377 is not a prime number  610 is not a prime number  987 is not a prime number  1597 is a prime number  2584 is not a prime number  4181 is not a prime number  6765 is not a prime number  10946 is not a prime number  17711 is not a prime number  28657 is a prime number  46368 is not a prime number  75025 is not a prime number  121393 is not a prime number |

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| e-mail me a completed solution to each of the above programs in a Word document, and include Labs #1-#4 in this document also.  e-mail to [Damian.Gordon@dit.ie](mailto:Damian.Gordon@dit.ie) with subject heading “DT255 PaA Lab #1-5” |