Question **1**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**procedure XYZ(a1,...,an: integers)**

**k:=0**

**for i:=1 to n do**

***if ai mod 2 = 0 then k:=ai***

**Find output value of k if input is 1, 2, 3, 7, 8, 6, 9, 12, 11.**

Answer:

Feedback

The correct answer is: 12

Question **2**

Not answered

Marked out of 1.00

Flag question

Question text

***The median* of a list of integers is determined after two steps:**

**Step 1: Sort the list in the increasing order**

**Step 2: If the numbers of element is odd, pick the element in the middle of the sorted list. If the number of the elements is even, pick the first of the two elements in the middle of the sorted list.**

**Find the median of the list**

**[41, 32, 8, 15, 24, 28, 11, 10, 58, 31, 7]**

Answer:

Feedback

The correct answer is: 24

Question **3**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Find the smallest integer n such that f(*x*) = *O*(*xn*).**

|  |  |
| --- | --- |
| 2 | Answer 1 |
| x+ln(x) | Answer 2 |
| x(x+1) | Answer 3 |

Feedback

The correct answer is: 2 → 0, x+ln(x) → 1, x(x+1) → 2

Question **4**

Not answered

Marked out of 1.00

Flag question

Question text

**Given the algorithm.  
  
procedure: XYZ(c, a1,...,an: real)  
p:= 1  
y: = 0  
for i:=1 to n-1 do**

***for j:=1 to (n-i) do***

***begin***

***p: = p \* c***

***y: = y + ai\*p***

***end***

**Let n = 10. Count the number of additions.**

Answer:

Feedback

The correct answer is: 45

Question **5**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Consider an encryption scheme using the function f(p) = 7*p*+3 mod 26.**

**Find the message produced from the message [11, 13, 3, 3, 1, 8].**

Select one:

a. [2,16, 24, 24, 10, 7]

b. [1, 6, 17, 17, 2, 9]

c. [2, 7, 1, 1, 8, 2]

d. [2, 21, 23, 23, 11, 12]

e. [2, 4, 19, 19, 3, 17]

Feedback

The correct answer is: [2,16, 24, 24, 10, 7]

Question **6**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Let m=75 1112 1390 and n = 24 73 1114. Choose correct statements:**

**(i) gcd(m, n) = 24 1390**

**(ii) gcd(m, n) = 73 1112**

**(iii) lcm(m, n) = 24 75 1114 1390**

Select one:

a. None of the other choices is correct

b. (ii), (iii).

c. (ii).

d. (i), (ii).

e. (i), (ii), (iii).

Feedback

The correct answer is: (ii), (iii).

Question **7**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**How many divisions are needed when using Euclidean algorithm to find the greatest common divisor of *a = 1982* *and* *b = 1872?***

Answer:

Feedback

The correct answer is: 3

Question **8**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Find octal expansion of (B5D)16.**

Answer:

Feedback

The correct answer is: 5535

Question **9**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Rearrange the steps in the correct order of a proof by induction of the proposition  
  
1 + 2 + 3 + ... + n = n(n+1)/2 for *n* positive integer.**

|  |  |
| --- | --- |
| The proposition is true for *n* = 1 because 1 = 1\*2/2. | Answer 1 |
| Assume the proposition is true for *n* = *k*. | Answer 2 |
| By induction, the proposition is true for all *n* positive integer. | Answer 3 |
| Then the proposition is also true for *n* = *k* + 1 because: 1 + 2+ 3+ ... + (k+1) = 1 + 2+ 3+ ... + k + (k+1) = k(k+1)/2+(k+1) = (k+1)(k+2)/2 | Answer 4 |

Feedback

The correct answer is: The proposition is true for *n* = 1 because 1 = 1\*2/2. → Step 1, Assume the proposition is true for *n* = *k*. → Step 2, By induction, the proposition is true for all *n* positive integer. → Step 4, Then the proposition is also true for *n* = *k* + 1 because: 1 + 2+ 3+ ... + (k+1) = 1 + 2+ 3+ ... + k + (k+1) = k(k+1)/2+(k+1) = (k+1)(k+2)/2 → Step 3

Question **10**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**Given the sequence *a*0 = 1, *an* = *a*0 + *a*1 + … + *an*–1 *for n* ≥ 1**

**Find *a*6 .**

Answer:

Feedback

The correct answer is: 32

Question **11**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**Find output of the recursive algorithm.**

**procedure pro(a: real, n: positive integer)**

**if n = 1 then**

***pro(a,n) := a***

**else**

***pro(a,n) := a + pro(a,n-1)***

Select one:

a. a\*n

b. an

c. an-1

d. a\*(n-1)

Feedback

The correct answer is: a\*n

Question **12**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Given the program segment.**

**i := 1**

**total := 0**

**while i< n**

***begin***

***total := total + i***

***i := i + 1***

***end***

**With the initial assertion "n = 6", find the final assertion "total =?"**

Answer:

Feedback

The correct answer is: 15

Question **13**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**How many positive integers not exceeding 100 and are divisible by neither 5 nor 7?**

Answer:

Feedback

The correct answer is: 68

Question **14**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**A person deposited 1000 000 VND in a bank at the rate of 1%/month. Find the interest in the 10th month.  
  
Round to the nearest VND.**

Answer:

Feedback

The correct answer is: 10937

Question **15**

Not answered

Marked out of 1.00

Flag question

Question text

**Given f=2f(n/2)+3, f(16)=51. Find f(4).**

Answer:

Feedback

The correct answer is: 10.5

Question **1**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**procedure XYZ(a1,...,an: integers)**

**k:=0**

**for i:=1 to n do**

***if ai mod 2 = 0 then k:=k+ai***

**Find output value of k if input is 1, 2, 3, 7, 8, 6, 9, 12, 11.**

Answer:

Feedback

The correct answer is: 28

Question **2**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Given the algorithm to find the maximum element of a list (studied in the textbook).  
  
procedure Max (a1,a2,...,an: integers)  
Max: =a1  
for i : = 2 to n do**

***if Max < ai then Max: = ai***

**If the input is the sequence 4, 1, 5, 2, 3, 9, 7, then all the values of the variable Max are:**

Select one:

a. 4, 5, 9

b. 1, 4, 5, 2, 9, 7

c. 4, 5, 9, 7

d. Các lựa chọn còn lại đều sai

e. 4, 1, 5, 9

Feedback

The correct answer is: 4, 5, 9

Question **3**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**Find the smallest integer n such that f(*x*) = *O*(*xn*).**

|  |  |
| --- | --- |
| 4x+5 | Answer 1 |
| [x(x^2+1)](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=x%28x%5E2%2B1%29) | Answer 2 |
| xln(x) | Answer 3 |

Feedback

The correct answer is: 4x+5 → 1, [x(x^2+1)](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=x%28x%5E2%2B1%29) → 3, xln(x) → 2

Question **4**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**Given the algorithm.  
  
procedure: po (c, a1,...,an: real)  
p:= 1  
y: = 0  
for i:=1 to n-1 do**

***for j:=1 to (n-i) do***

***begin***

***p: = p \* c***

***y: = y + ai\*p***

***end***

**Let n = 10. Count the number of multiplications.**

Answer:

Feedback

The correct answer is: 90

Question **5**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**A sequence of pseudorandom numbers is generated as follows**

***x*0 = 5**

***xi* = ( 7*xi*–1 + 10 ) mod 17 *if i* > 0**

**Find *x*4 .**

Answer:

Feedback

The correct answer is: 8

Question **6**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**Let m=23 32 58 135 và n = 25 33 55112. Choose correct statements:**

**(i) gcd(m, n) = 24 1390.**

**(ii) gcd(m, n) = 23 33 53**

**(iii) lcm(m, n) = 25 33 58 112 135**

**(iv) lcm(m, n) = 23 32 55 112 135**

Select one:

a. (i), (iv).

b. (ii), (iii).

c. (i), (iii).

d. None of the other choices is correct

e. (ii), (iv).

Feedback

The correct answer is: None of the other choices is correct

Question **7**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**How many divisions are needed when using Euclidean algorithm to find the greatest common divisor of *a* = 2765 *and b* = 2196?**

Answer:

Feedback

The correct answer is: 7

Question **8**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Find base 7 expansion of (234)5.**

Answer:

Feedback

The correct answer is: 126

Question **9**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Rearrange the steps in the correct order of a proof by induction of the proposition  
  
1 + 3 + 5 + ... + (2*n* - 1) = *n*2 for *n* positive integer.**

|  |  |
| --- | --- |
| The proposition is true for *n* = 1 because 1 = 12. | Answer 1 |
| By induction, the proposition is true for all *n* positive integer. | Answer 2 |
| Then the proposition is also true for *n* = *k* + 1 because: 1 + 3 + 5 + ... + (2(*k*+1) - 1) = 1 + 3 + 5 + ... + (2*k* - 1) + (2*k*+1) = *k*2 + 2*k* + 1 = (*k*+1)2 | Answer 3 |
| Assume that the proposition is true for *n* = *k*. | Answer 4 |

Feedback

The correct answer is: The proposition is true for *n* = 1 because 1 = 12. → Step 1, By induction, the proposition is true for all *n* positive integer. → Step 4, Then the proposition is also true for *n* = *k* + 1 because: 1 + 3 + 5 + ... + (2(*k*+1) - 1) = 1 + 3 + 5 + ... + (2*k* - 1) + (2*k*+1) = *k*2 + 2*k* + 1 = (*k*+1)2 → Step 3, Assume that the proposition is true for *n* = *k*. → Step 2

Question **10**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Given the sequence *a*0 = 1, *a*1 = 2, *an* = *an*–1 + 2*an*–2 *for n* ≥ 2  
  
Find *a*5**

Answer:

Feedback

The correct answer is: 32

Question **11**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Given the recursive algorithm.  
  
Procedure pow(a, n: positive integers )  
  
If n = 0 then**

***pow(a,n):= 1***

**else**

***pow(a,n):= a.pow(a,n-1)***

**Print(pow(a,n))  
  
Find output if input = (3, 4).**

Answer:

Feedback

The correct answer is: 81

Question **12**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**Choose a loop invariant in the program segment.**

**i := 1**

**total := 1**

**while****[i \leq n](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=i%20%5Cleq%20n)**

***begin***

***i := i + 1***

***total := total + i***

***end***

Select one:

a. total=n(n + 1)/2 and [i \leq n](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=i%20%5Cleq%20n)

b. total=i(i + 1)/2 and [i \leq n](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=i%20%5Cleq%20n)

c. total=n(n + 1)/2 and [i \leq n+1](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=i%20%5Cleq%20n%2B1)

d. total=i(i + 1)/2 and [i \leq n+1](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=i%20%5Cleq%20n%2B1)

Feedback

The correct answer is: total=i(i + 1)/2 and [i \leq n+1](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=i%20%5Cleq%20n%2B1)

Question **13**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

**How many positive integers not exceeding 1000 and are divisible by 2 or 5?**

Answer:

Feedback

The correct answer is: 600

Question **14**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Find the general formula of the sequence****[a_n = 3a_{n-1},\, a_0=2](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=a_n%20%3D%203a_%7Bn-1%7D%2C%5C%2C%20a_0%3D2)**

Select one:

a. None of the other choices is correct

b. [a_n = 2+3n](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=a_n%20%3D%202%2B3n)

c. [a_n = 3.2^n](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=a_n%20%3D%203.2%5En)

d. [a_n = 2.3^{n-1}](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=a_n%20%3D%202.3%5E%7Bn-1%7D)

e. [a_n = 2.3^n](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=a_n%20%3D%202.3%5En)

Feedback

The correct answer is: [a_n = 2.3^n](https://cmshn.fpt.edu.vn/filter/tex/displaytex.php?texexp=a_n%20%3D%202.3%5En)

Question **15**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

**Given f( n)=f(n/3)+2n, f(1)=1. Find f(27).**

Answer:

Feedback

The correct answer is: 79