Question 1

Not answered

Marked out of 1.00

Flag question

Question text

Find the output value of n if input *a* = 200.

Procedure XYZ(a: integer)

n:=0

while a $\neq$ 0

n: = n + (a mod 2)

a: = $\lfloor a/2 \rfloor$

Print(n)

Answer:

Feedback

The correct answer is: 3

Question 2

Not answered

Marked out of 1.00

Flag question

Question text

Find the output of:

Greedy Change-Making Algorithm

Input: 1099 cents

Output: The total number of coins using: Quarters, Dimes, Nickles, Pennies

Answer:

Feedback

The correct answer is: 49

Question 3

Complete
Mark 0.00 out of 1.00

Flag question

Question text

Find the smallest integer n such that f(x) = $O(x^n)$.

2^x Answer 1: 4

$2x^3.\ln(x)$ Answer 2: 9

$(x^3 - x^2 + x - 1)^3$ Answer 3: Does not exist

Feedback

The correct answer is: 2^x → Does not exist, $2x^3.\ln(x)$ → 4, $(x^3 - x^2 + x - 1)^3$ → 9

Question 4

Not answered
Marked out of 1.00

Flag question

Question text

Given the algorithm.

procedure: po (c, a_1,...,a_n: 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 + a_i*p

end

Let n = 10. Count the number of multiplications.

Answer:

Feedback

The correct answer is: 90

Question 5

Not answered
Marked out of 1.00

Flag question

Question text

A sequence of pseudorandom numbers is generated as follows

$$x_0 = 5$$

$$x_i = (7x_{i-1} + 10) \bmod 17 \text{ if } i > 0$$

Find x_5 .

Answer:

Feedback

The correct answer is: 15

Question 6

Not answered
Marked out of 1.00

Flag question

Question text

gcd(m, n) = $7^3\ 11^{12}$ and lcm(m, n) = $2^4\ 7^5\ 11^{13}\ 13^4$. Choose correct statements:

(i) m=$7^5\ 11^{12}13^4$ and n = $2^4\ 7^3\ 11^{13}$

(ii) m=$2^4\ 7^5\ 11^{13}\ 13^2$ and n = $7^3\ 11^{12}\ 13^2$

Select one:

- a. (i)
- b. None of the other choices is correct
- c. (ii)
- d. Both (i), (ii).

Feedback

The correct answer is: (i)

Question 7

Not answered

Marked out of 1.00

Flag question

Question text

When using the modular exponentiation algorithm to compute 6^6 mod 13, the remainders computed by successively squaring are:

Select one:

- a. Các lựa chọn còn lại đều sai.
- b. 10, 9
- c. 1, 6, 36
- d. 6, 10, 9

Feedback

The correct answer is: 6, 10, 9

Question **8**

Not answered

Marked out of 1.00

Flag question

Question text

Find octal expansion of $(BD5)_{16}$.

Answer:

Feedback

The correct answer is: 5725

Question **9**

Not answered

Marked out of 1.00

Flag question

Question text

Rearrange the steps in the correct order of a proof by induction of the proposition

1*1! + 2*2! + 3*3! + ... + n*n! = (n+1)!-1 for all n positive integer.

Then the proposition is also true for $n = k + 1$ because: 1*1! + 2*2!+ 3*3!+ ... + (k+1)*(k+1)! = 1*1! + 2*2!+ 3*3!+ ... + k*k!+(k+1)*(k+1)! = (k+1)!-1+ (k+1)*(k+1)! = (k+2)!-1

Assume the proposition is true for $n = k$.

By induction, the proposition is true for all n positive integers.

The proposition is true for n = 1 because 1*1! = 2!-1.

Answer 1: Choose...

Answer 2: Choose...

Answer 3: Choose...

Answer 4: Choose...

Feedback

The correct answer is: Then the proposition is also true for $n = k + 1$ because: 1*1! + 2*2!+ 3*3!+ ... + (k+1)*(k+1)! = 1*1! + 2*2!+ 3*3!+ ... + k*k!+(k+1)*(k+1)! = (k+1)!-1+(k+1)*(k+1)! =

(k+2)!-1 → Step 3, Assume the proposition is true for $n = k$. → Step 2, By induction, the proposition is true for all n positive integers. → Step 4, The proposition is true for n = 1 because 1*1! = 2!-1. → Step 1

Question 10

Not answered
Marked out of 1.00

Flag question

Question text

Given the sequence

$a_0 = 1, a_1 = 2, a_n = a_{n-1} + 2a_{n-2}$ for $n \geq 2$
Find a_6 .

Answer:

Feedback

The correct answer is: 64

Question 11

Not answered
Marked 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

Not answered
Marked out of 1.00

Flag question

Question text

Choose a loop invariant in the program segment.

i := 1

total := 1

while $i \leq n$

begin

i := i + 1

total := total + i

end

Select one:

- a. total=i(i + 1)/2 and $i \leq n+1$
- b. total=n(n + 1)/2 and $i \leq n+1$
- c. total=n(n + 1)/2 and $i \leq n$
- d. total=i(i + 1)/2 and $i \leq n$

Feedback

The correct answer is: total=i(i + 1)/2 and $i \leq n+1$

Question 13

Not answered
Marked out of 1.00

Flag question

Question text

How many functions from a set of 5 elements to a set of 2 elements?

Answer:

Feedback

The correct answer is: 32

Question 14

Not answered
Marked out of 1.00

Flag question

Question text

Find the general formula of the sequence

$a_n = a_{n-1} + n,\ a_0 = 1$

Select one:

- a. None of the other choices is correct
- b. $a_n = \frac{n^2+n+2}{2}$
- c. $a_n = \frac{n(n+1)}{2}$
- d. $a_n = \frac{n^2+2n}{2}$
- e. $a_n = n!$

Feedback

The correct answer is: $a_n = \frac{n^2+n+2}{2}$

Question 15

Not answered
Marked 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

Question 1

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find output value of S.

procedure tong

S:= 0

for i:=1 to 3

for j:=i to 3

S:=S + i + j

Answer: 24

Feedback

The correct answer is: 24

Question 2

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the output of:

Greedy Change-Making Algorithm

Input: 1088 cents

Output: The total number of coins using: Quarters, Dimes, Nickles, Pennies

Answer: 47

Feedback

The correct answer is: 47

Question 3

Complete

Mark 0.67 out of 1.00

Flag question

Question text

Which are correct?

$n!$ is O(2^n) — Answer 1: No

$n^2+nlog(n)$ is O(nlog(n)) — Answer 2: Yes

2^n is O($n!$) — Answer 3: Yes

Feedback

The correct answer is: $n!$ is O(2^n) → No, $n^2+nlog(n)$ is O(nlog(n)) → No, 2^n is O($n!$) → Yes

Question 4

Not answered

Marked out of 1.00

Flag question

Question text

Given the algorithm.

procedure: XYZ(c, a_1,...,a_n: 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 + a_i*p

end

Let n = 10. Count the total number of additions and multiplications.

Answer:

Feedback

The correct answer is: 135

Question **5**

Complete
Mark 1.00 out of 1.00

Flag question

Question text

A sequence of pseudorandom numbers is generated as follows

$$x_0 = 4$$

$$x_i = (6x_{i-1} + 5) \bmod 17 \text{ if } i > 0$$

Find x_6 .

Answer: 5

Feedback

The correct answer is: 5

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let $m=7^5\ 11^{12}\ 13^{90}$ and $n = 2^4\ 7^3\ 11^{14}$. Choose correct statements:

(i) gcd(m, n) = $2^4\ 13^{90}$

(ii) gcd(m, n) = $7^3\ 11^{12}$

(iii) lcm(m, n) = $2^4\ 7^5\ 11^{14}\ 13^{90}$

Select one:

- a. (i), (ii).
- b. (ii), (iii).
- c. (i), (ii), (iii).
- d. (ii).
- e. None of the other choices is correct

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 = 846 and b = 238?*

Answer: 4

Feedback

The correct answer is: 5

Question 8

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find octal expansion of $(BA6)_{16}$.

Answer: 5646

Feedback

The correct answer is: 5646

Question 9

Complete

Mark 0.25 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.

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

By induction, the proposition is true for all n positive integer.

The proposition is true for $n = 1$ because 1 = 1*2/2.

Assume the proposition is true for $n = k$.

Answer 1: Step 2

Answer 2: Step 4

Answer 3: Step 3

Answer 4: Step 1

Step 1

Feedback

The correct answer is: 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, By induction, the proposition is true for all n positive integer. → Step 4, The proposition is true for $n = 1$ because 1 = 1*2/2. → Step 1, Assume the proposition is true for $n = k$. → Step 2

Question 10

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Find f(4) if

f(0) = -1, f(1) = 2, f(n+1) = f(n) + 3f(n-1) , n = 1, 2, 3, ...

Answer: 2

Feedback

The correct answer is: 2

Question 11

Complete
Mark 0.00 out of 1.00

Flag question

Question text

How many comparisons are needed to merge two ordered lists

[2, 9, 12, 20, 23] and [3, 4, 5, 6, 7, 8, 17]

using the merge algorithm in the textbook?

Answer: 4

Feedback

The correct answer is: 10

Question **12**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Choose riant in the program segment.

```
i := 1
total := 1
while i < n
begin
i := i + 1
total := total + i
end
```

Select one:

a. total=$i(i+1)/2$ and i less than or equal n

b. total=$(n+1)$ và i less than or equal n

c. total=$n(n+1)/2$ and i less than n

d. total=$i(i+1)/2$ and i less than n

Feedback

The correct answer is: total=$i(i+1)/2$ and i less than or equal n

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 3 or 5?

Answer: 468

Feedback

The correct answer is: 467

Question 14

Not answered
Marked out of 1.00

Flag question

Question text

A young pair of rabbits (one of each sex) is placed on an island. A pair of rabbits does not breed until they are 2 month old. After they are 2 month old they will produce 3 pairs of rabbits each month. Find the number of pairs of rabbits after 6 months.

Answer:

Feedback

The correct answer is: 40

Question 15

Not answered
Marked out of 1.00

Flag question

Question text

Given f (n)=3 f(n/2)+1, f (1)=1. Find f(8).

Answer:

Feedback

The correct answer is: 40

Question 1

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Find the output value of n if input *a* = 31.
Procedure XYZ(a: integer)

n:=0

while a $\neq$ 0

n: = n + (a mod 2)

a: = $\lfloor a/2 \rfloor$

Print (n)

Answer: 5

Feedback

The correct answer is: 5

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 (a_1,a_2,...,a_n: integers)
Max: =a_1
for i : = 2 to n do

if Max < a_i then Max: = a_i

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

Select one:

- a. Các lựa chọn còn lại đều sai
- b. 1, 4, 5, 2, 7, 9
- c. 1, 5, 7, 9
- d. 1, 4, 5, 7, 9
- e. 4, 5, 7, 9

Feedback

The correct answer is: 1, 4, 5, 7, 9

Question 3

Complete
Mark 0.00 out of 1.00

Flag question

Question text

3n is O(n+log(n))	Answer 1	No
n+log(n) is O(log(n))	Answer 2	Yes
n+log(n) is O(n)	Answer 3	No

Feedback

The correct answer is: 3n is O(n+log(n)) → Yes, n+log(n) is O(log(n)) → No, n+log(n) is O(n) → Yes

Question 4

Complete
Mark 0.00 out of 1.00

Flag question

Question text

Given the algorithm.
procedure *f*(a_1,a_2,…,a_n)

t : = 1

i : = 1

while ((*t* > 0) and ($i < \lfloor n/2 \rfloor$))

if ($a_i \neq a_{n-i+1}$) *then t := 0*

else i := 2i

Let n = 200. Count the number of comparisons used in the worst case.

Answer: 3

Feedback

The correct answer is: 23

Question 5

Complete

Mark 1.00 out of 1.00

Flag question

Question text

A sequence of pseudorandom numbers is generated as follows

$$x_0 = 4$$

$$x_i = (6x_{i-1} + 5) \bmod 17 \text{ if } i > 0$$

Find x_5 .

Answer: 0

Feedback

The correct answer is: 0

Question 6

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Let $m=2^3\ 3^2\ 5^8\ 13^5$ và $n = 2^5\ 3^3\ 5^5 11^2$. Choose correct statements:

(i) gcd(m, n) = $2^4\ 13^{90}$.

(ii) gcd(m, n) = $2^3\ 3^3\ 5^3$

(iii) lcm(m, n) = $2^5\ 3^3\ 5^8\ 11^2\ 13^5$

(iv) lcm(m, n) = $2^3\ 3^2\ 5^5\ 11^2\ 13^5$

Select one:

- a. (i), (iii).
- b. None of the other choices is correct
- c. (i), (iv).
- d. (ii), (iv).
- e. (ii), (iii).

Feedback

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

Question 7

Complete
Mark 1.00 out of 1.00

Flag question

Question text

When using the modular exponentiation algorithm to compute 2^7 mod 7, the remainders computed by successively squaring are:

Select one:

- a. 1, 2, 4
- b. 2, 4, 2
- c. 2, 4, 6
- d. Các lựa chọn còn lại đều sai.

Feedback

The correct answer is: 2, 4, 2

Question 8

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Find octal expansion of $(987)_{16}$.

Answer: 4607

Feedback

The correct answer is: 4607

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

$1 + 3 + 5 + \ldots + (2n - 1) = n^2$ for n positive integer.

Then the proposition is also true for $n = k + 1$ because: $1 + 3 + 5 + \ldots + (2(k+1) - 1) = 1 + 3 + 5 + \ldots + (2k - 1) + (2k+1) = k^2 + 2k + 1 = (k+1)^2$

The proposition is true for $n = 1$ because $1 = 1^2$.

By induction, the proposition is true for all n positive integer.

Assume that the proposition is true for $n = k$.

Answer 1: Step 3

Answer 2: Step 1

Answer 3: Step 4

Answer 4: Step 2

Feedback

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

$a_0 = 1, a_1 = 2, a_n = 2a_{n-1} + a_{n-2}$ **for** $n = 2, 3, 4, \ldots$

Find a_5 **.**

Answer: 70

Feedback

The correct answer is: 70

Question 11

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Given the recursive algorithm.

procedure gcd(a, b: non-negative integers, a < b)

if a = 0 then

gcd(a, b) = b

else

gcd(a, b) = gcd(b mod a, a)

Find gcd(20, 28)

Answer: 4

Feedback

The correct answer is: 4

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: 15

Feedback

The correct answer is: 15

Question 13

Complete
Mark 1.00 out of 1.00

Flag question

Question text

How many phone numbers consisting of 4 distinct digits that end with a 0?

Answer: 504

Feedback

The correct answer is: 504

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 7th month.

Round to the nearest VND.

Answer: 1061520

Feedback

The correct answer is: 10615

Question 15

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Given f (n)=3 f(n/2)+1, f (1)=1. Find f(16).

Answer: 121

Feedback

The correct answer is: 121

Question 1

Complete
Mark 1.00 out of 1.00

Flag question

Question text

procedure TT(*n*: nguyên dương)

begin

***S*:=0;**

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

***S*:= *S*+i^3;**

end

Find output value of S if input *n* = 4.

Answer: 100

Feedback

The correct answer is: 100

Question 2

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Given the Insertion sort algorithm (studied in the textbook)

procedure Insertionsort (a_1,a_2,...,a_n: integers)

for i:=2 to n do

j:=1

while a_j<a_i

j:=j+1

m:=a_j

for k:=i+1 down to j+1 do

a_k:=a_{k-1}

$a_j := m$

If input = 3, 2, 4, 7, 1, 6, 5, after running the outer loop with i = 3, the order of the elements in the list is:

Select one:

- a. 2, 3, 4, 7, 1, 5, 6
- b. 2, 3, 4, 1, 7, 5, 6
- c. Các lựa chọn còn lại đều sai
- d. 2, 3, 7, 4, 1, 5, 6
- e. 2, 3, 4, 7, 1, 6, 5

Feedback

The correct answer is: 2, 3, 4, 7, 1, 6, 5

Question 3

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Find the smallest integer n such that f(x) = $O(x^n)$.

2 Answer 1: 0

x(x+1) Answer 2: 2

x+ln(x) Answer 3: 1

Feedback

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

Question 4

Not answered
Marked out of 1.00

Flag question

Question text

Given the algorithm.

procedure: XYZ(c, a_1,...,a_n: 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 + a_i*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

A sequence of pseudorandom numbers is generated as follows

$$x_0 = 4$$

$$x_i = (6x_{i-1} + 5) \bmod 13 \text{ if } i > 0$$

Find x_5 .

Answer: 9

Feedback

The correct answer is: 9

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let $m=7^5\ 11^{12}\ 13^{90}$ and $n = 2^4\ 7^3\ 11^{14}$. Choose correct statements:

(i) gcd(m, n) = $2^4\ 13^{90}$

(ii) gcd(m, n) = $7^3\ 11^{12}$

(iii) lcm(m, n) = $2^4\ 7^5\ 11^{14}\ 13^{90}$

Select one:

- a. (i), (ii), (iii).
- b. (i), (ii).
- c. (ii), (iii).
- d. None of the other choices is correct
- e. (ii).

Feedback

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

Question 7

Complete

Mark 1.00 out of 1.00

Flag question

Question text

When using the modular exponentiation algorithm to compute 3^{10} mod 7, the remainders computed by successively squaring are:

Select one:

- a. 3, 4, 2, 1
- b. 1, 3, 2, 4
- c. 3, 2, 4, 2
- d. Các lựa chọn còn lại đều sai.

Feedback

The correct answer is: 3, 2, 4, 2

Question 8

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find base 7 expansion of $(430)_5$.

Answer: 223

Feedback

The correct answer is: 223

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

$1 + 3 + 5 + ... + (2n - 1) = n^2$ for n positive integer.

Then the proposition is also true for $n = k + 1$ because: $1 + 3 + 5 + ... + (2(k+1) - 1) = 1 + 3 + 5 + ... + (2k - 1) + (2k+1) = k^2 + 2k + 1 = (k+1)^2$

Answer 1

Step 3

By induction, the proposition is true for all n positive integer.

The proposition is true for $n = 1$ because $1 = 1^2$.

Assume that the proposition is true for $n = k$.

Answer 2: Step 4

Answer 3: Step 1

Answer 4: Step 2

Feedback

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

$a_0 = 1, a_n = a_0 + a_1 + \ldots + a_{n-1}$ **for** $n = 1, 2, 3, \ldots$

Find a_5 **.**

Answer: 16

Feedback

The correct answer is: 16

Question 11

Complete

Mark 1.00 out of 1.00

Flag question

Question text

How many comparisons are needed to merge two ordered lists

[2, 9, 12, 17, 20] and [1, 4, 5, 6, 7, 8, 23]

using the merge algorithm in the textbook?

Answer: 11

Feedback

The correct answer is: 11

Question 12

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the program segment.

i := 1

total := 1

while i < n

begin

i := i + 1

total := total + i

end

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

Answer: 21

Feedback

The correct answer is: 21

Question 13

Complete

Mark 0.00 out of 1.00

Flag question

Question text

How many functions from a set of 2 elements to a set of 5 elements?

Answer: 10

Feedback

The correct answer is: 25

Question 14

Complete
Mark 0.00 out of 1.00

Flag question

Question text

Determine if the recursive relations are satisfied by the sequence $a_n = (-1)^n$?

$a_n = -a_{n-1}$ Answer 1: No

$a_n = -a_{n-2}$ Answer 2: Yes

$a_n = 2a_{n-1} + a_{n-2}$ Answer 3: Yes

$a_n = a_{n-1} + 2a_{n-2}$ Answer 4: No

Feedback

The correct answer is: $a_n = -a_{n-1} \rightarrow$ Yes, $a_n = -a_{n-2} \rightarrow$ No, $a_n = 2a_{n-1} + a_{n-2} \rightarrow$ No, $a_n = a_{n-1} + 2a_{n-2} \rightarrow$ Yes

Question 15

Not answered
Marked out of 1.00

Flag question

Question text

Given $f(n) = 2.f(\sqrt{n})^2 + 1, f(2) = 1$. Find f(16).

Answer:

Feedback

The correct answer is: 19

Question 1

Complete

Mark 0.00 out of 1.00

Flag question

Question text

procedure XYZ(a_1,...,a_n: integers)
k:=0

for i:=1 to n do

if a_i mod 2 = 0 then k:=k+a_i

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

Answer: 38

Feedback

The correct answer is: 28

Question 2

Complete

Mark 0.00 out of 1.00

Flag question

Question text

The Binary search algorithm (studied in the textbook) successively divide the list into two sublists.

procedure BinarySearch (a_1<a_2<...<a_n, x: integers)

while (i<j)

m:= $\lfloor (i+j)/2 \rfloor$

if x>a_m then i:=m+1

else j:=m

if x = a_i then location:= i

else location:=0

If input = 2, 4, 5, 7, 8, 9, 10, 13 and x = 6, after the third time of dividing into sublists, the sublist to be considered is:

Select one:

- a. 7
- b. 5
- c. 7, 8
- d. 5, 7
- e. Các lựa chọn còn lại đều sai

Feedback

The correct answer is: 7

Question 3

Complete
Mark 0.67 out of 1.00

Flag question

Question text

Which are correct?

2n is O(log n) Answer 1 [No]

2log n is O (n) Answer 2 [Yes]

nlog(n) is O(n) Answer 3 [Yes]

Feedback

The correct answer is: 2n is O(log n) → No, 2log n is O (n) → Yes, nlog(n) is O(n) → No

Question 4

Not answered
Marked out of 1.00

Flag question

Question text

Given the algorithm.

procedure $f(a_1,a_2,\ldots,a_n$: integers, n: *integer* > 2, x: integer)

$i := 1$

while ($i < n$ and $a_i + a_{n-i} \neq x$)

$i := i + 1$

if ($i < n$) then *output* := i

else *output* := 0

***Let n* = 500. Count the number of additions in the worst case.**

Answer:

Feedback

The correct answer is: 998

Question 5

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Let a = -215 div 13 and b = -213 mod 13. Find a+b.

Answer: -21

Feedback

The correct answer is: -9

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let $m=2^3\ 3^2\ 5^8\ 13^5$ và $n = 2^5\ 3^3\ 5^5 11^2$. Choose correct statements:

(i) gcd(m, n) = $2^4\ 13^{90}$.

(ii) gcd(m, n) = $2^3\ 3^3\ 5^3$

(iii) lcm(m, n) = $2^5\ 3^3\ 5^8\ 11^2\ 13^5$

(iv) lcm(m, n) = $2^3\ 3^2\ 5^5\ 11^2\ 13^5$

Select one:

- a. (i), (iii).
- b. None of the other choices is correct
- c. (i), (iv).
- d. (ii), (iii).
- 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 = 1982 and b = 1872?*

Answer: 4

Feedback

The correct answer is: 3

Question **8**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find base 5 expansion of $(564)_7$.

Answer: 2131

Feedback

The correct answer is: 2131

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

$1 + 2 + 3 + \ldots + n = n(n+1)/2$ for *n* positive integer.

The proposition is true for $n = 1$ because $1 = 1*2/2$.

Assume the proposition is true for $n = k$.

By induction, the proposition is true for all n positive integer.

Then the proposition is also true for $n = k + 1$ because: $1 + 2+ 3+ \ldots + (k+1) = 1 + 2+ 3+ \ldots + k + (k+1) = k(k+1)/2+(k+1) = (k+1)(k+2)/2$

Answer 1: Step 1

Answer 2: Step 2

Answer 3: Step 4

Answer 4: Step 3

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 1.00 out of 1.00

Flag question

Question text

Given the sequence

$a_n = a^2_{n-1}$-1 and a_0 = 2.

Find a_4.

Answer: 3968

Feedback

The correct answer is: 3968

Question 11

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Given the recursive algorithm.

procedure fac(n: non-negative integer)

if n = 0 then

fac(n):= 1

else

fac(n):= n*fac(n-1)

print(fac(n))

Find output if n = 5.

Answer: 120

Feedback

The correct answer is: 120

Question 12

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the program segment.

i := 1

total := 1

while $i \leq n$

begin

i := i + 1

total := total + i

end

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

Answer: 28

Feedback

The correct answer is: 28

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: 34

Feedback

The correct answer is: 68

Question 14

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the general formula of the sequence

$a_n = a_{n-1} + 2,\ a_0 = 3$

Select one:

- a. $a_n = 2.(n-1)+1$
- b. None of the other choices is correct
- c. $a_n = 2.n+1$
- d. $a_n = 3.2^n$
- e. $a_n = 2.(n+1)+1$

Feedback

The correct answer is: $a_n = 2.(n+1)+1$

Question 15

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given = 2.f(\sqrt{n}) + log_2n, f(2) = 1" alt="f = 2.f(\sqrt{n}) + log_2n, f(2) = 1" src="https://cmshn.fpt.edu.vn/filter/tex/pix.php/33b55803ab1cc70500d5f8f8dc28859c.png" />. Find f(16).

Answer: 12

Feedback

The correct answer is: 12

Question 1

Complete

Mark 0.00 out of 1.00

Flag question

Question text

procedure XYZ(a_1,...,a_n: integers)
k:=0

for i:=1 to n do

if a_i mod 2 = 0 then k:=k+a_i

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

Answer: 38

Feedback

The correct answer is: 28

Question 2

Complete

Mark 0.00 out of 1.00

Flag question

Question text

The Binary search algorithm (studied in the textbook) successively divide the list into two sublists.

procedure BinarySearch (a_1<a_2<...<a_n, x: integers)

while (i<j)

m:= $\lfloor (i+j)/2 \rfloor$

if x>a_m then i:=m+1

else j:=m

if x = a_i then location:= i

else location:=0

If input = 2, 4, 5, 7, 8, 9, 10, 13 and x = 6, after the third time of dividing into sublists, the sublist to be considered is:

Select one:

- a. 7
- b. 5
- c. 7, 8
- d. 5, 7
- e. Các lựa chọn còn lại đều sai

Feedback

The correct answer is: 7

Question 3

Complete
Mark 0.67 out of 1.00

Flag question

Question text

Which are correct?

2n is O(log n) Answer 1 [No]

2log n is O (n) Answer 2 [Yes]

nlog(n) is O(n) Answer 3 [Yes]

Feedback

The correct answer is: 2n is O(log n) → No, 2log n is O (n) → Yes, nlog(n) is O(n) → No

Question 4

Not answered
Marked out of 1.00

Flag question

Question text

Given the algorithm.

procedure $f(a_1,a_2,\ldots,a_n$: integers, n: *integer* > 2, x: integer)

$i := 1$

while ($i < n$ and $a_i + a_{n-i} \neq x$)

$i := i + 1$

if ($i < n$) then *output* := i

else *output* := 0

***Let n* = 500. Count the number of additions in the worst case.**

Answer:

Feedback

The correct answer is: 998

Question 5

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Let a = -215 div 13 and b = -213 mod 13. Find a+b.

Answer: -21

Feedback

The correct answer is: -9

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let $m=2^3\ 3^2\ 5^8\ 13^5$ và $n = 2^5\ 3^3\ 5^5 11^2$. Choose correct statements:

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(ii) gcd(m, n) = $2^3\ 3^3\ 5^3$

(iii) lcm(m, n) = $2^5\ 3^3\ 5^8\ 11^2\ 13^5$

(iv) lcm(m, n) = $2^3\ 3^2\ 5^5\ 11^2\ 13^5$

Select one:

- a. (i), (iii).
- b. None of the other choices is correct
- c. (i), (iv).
- d. (ii), (iii).
- 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 = 1982 and b = 1872?*

Answer: 4

Feedback

The correct answer is: 3

Question **8**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find base 5 expansion of $(564)_7$.

Answer: 2131

Feedback

The correct answer is: 2131

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

$1 + 2 + 3 + \ldots + n = n(n+1)/2$ for *n* positive integer.

The proposition is true for $n = 1$ because $1 = 1*2/2$.

Assume the proposition is true for $n = k$.

By induction, the proposition is true for all n positive integer.

Then the proposition is also true for $n = k + 1$ because: $1 + 2+ 3+ \ldots + (k+1) = 1 + 2+ 3+ \ldots + k + (k+1) = k(k+1)/2+(k+1) = (k+1)(k+2)/2$

Answer 1: Step 1

Answer 2: Step 2

Answer 3: Step 4

Answer 4: Step 3

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 1.00 out of 1.00

Flag question

Question text

Given the sequence

$a_n = a^2_{n-1}$-1 and a_0 = 2.

Find a_4.

Answer: 3968

Feedback

The correct answer is: 3968

Question 11

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Given the recursive algorithm.

procedure fac(n: non-negative integer)

if n = 0 then

fac(n):= 1

else

fac(n):= n*fac(n-1)

print(fac(n))

Find output if n = 5.

Answer: 120

Feedback

The correct answer is: 120

Question 12

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the program segment.

i := 1

total := 1

while $i \leq n$

begin

i := i + 1

total := total + i

end

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

Answer: 28

Feedback

The correct answer is: 28

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: 34

Feedback

The correct answer is: 68

Question 14

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the general formula of the sequence

$a_n = a_{n-1} + 2,\ a_0 = 3$

Select one:

- a. $a_n = 2.(n-1)+1$
- b. None of the other choices is correct
- c. $a_n = 2.n+1$
- d. $a_n = 3.2^n$
- e. $a_n = 2.(n+1)+1$

Feedback

The correct answer is: $a_n = 2.(n+1)+1$

Question 15

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given = 2.f(\sqrt{n}) + log_2n, f(2) = 1" alt="f = 2.f(\sqrt{n}) + log_2n, f(2) = 1" src="https://cmshn.fpt.edu.vn/filter/tex/pix.php/33b55803ab1cc70500d5f8f8dc28859c.png" />. Find f(16).

Answer: 12

Feedback

The correct answer is: 12

Question 1

Complete

Mark 1.00 out of 1.00

Flag question

Question text

procedure XYZ(a_1,...,a_n: integers)

k:=0

for i:=1 to n do

if a_i mod 2 = 0 then k:=a_i

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

Answer: 12

Feedback

The correct answer is: 12

Question 2

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the output of:

Greedy Change-Making Algorithm

Input: 1088 cents

Output: The number of coins of each type: Quarters, Dimes, Nickles, Pennies

Select one:

- a. 44 , 1 , 0 , 2
- b. 40 , 8 , 1 , 3
- c. 42 , 3 , 0 , 8
- d. 43, 1, 0 , 3

Feedback

The correct answer is: 43, 1, 0 , 3

Question 3

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Find the smallest integer n such that f(x) = $O(x^n)$.

$x^2+ln(x)$ Answer 1: 2

$x^2ln(x)$ Answer 2: 3

$(x^2+x-1)/(x+3)$ Answer 3: 1

Feedback

The correct answer is: $x^2+ln(x) \rightarrow 2$, $x^2ln(x) \rightarrow 3$, $(x^2+x-1)/(x+3) \rightarrow 1$

Question 4

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Given the algorithm.

procedure: po (c, a_1,...,a_n: 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 + a_i*p

end

Let n = 4. Count the number of multiplications.

Answer: 12

Feedback

The correct answer is: 12

Question 5

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Let a = -214 div 15 and b = -214 mod 15. Find a+b.

Answer: -18

Feedback

The correct answer is: -4

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let m=7^5 11^{12} 13^{90} and n = 2^4 7^3 11^{14}. Choose correct statements:

(i) gcd(m, n) = $2^4\ 13^{90}$

(ii) gcd(m, n) = $7^3\ 11^{12}$

(iii) lcm(m, n) = $2^4\ 7^5\ 11^{14}\ 13^{90}$

Select one:

- a. (ii).
- b. None of the other choices is correct
- c. (i), (ii), (iii).
- d. (i), (ii).
- e. (ii), (iii).

Feedback

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

Question 7

Complete

Mark 1.00 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: 3

Feedback

The correct answer is: 3

Question 8

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find octal expansion of $(ABC)_{16}$.

Answer: 5274

Feedback

The correct answer is: 5274

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

$1 + 3 + 5 + \ldots + (2n - 1) = n^2$ for n positive integer.

Assume that the proposition is true for $n = k$.

By induction, the proposition is true for all n positive integer.

The proposition is true for $n = 1$ because $1 = 1^2$.

Then the proposition is also true for $n = k + 1$ because: $1 + 3 + 5 + \ldots + (2(k+1) - 1) = 1 + 3 + 5 + \ldots + (2k - 1) + (2k+1) = k^2 + 2k + 1 = (k+1)^2$

Answer 1: Step 2

Answer 2: Step 4

Answer 3: Step 1

Answer 4: Step 3

Feedback

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

Question 10

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the sequence

$a_0 = 1, a_1 = 2, a_n = a_{n-1} + 2a_{n-2}$ for $n \geq 2$
Find a_7 .

Answer: 128

Feedback

The correct answer is: 128

Question **11**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

How many comparisons are needed to merge two ordered lists

[2, 9, 12, 17, 20, 23] and [1, 4, 5, 6, 7, 8, 30]

using the merge algorithm in the textbook?

Answer: 12

Feedback

The correct answer is: 12

Question **12**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Given the program segment.

```
i := 1
total := 1
while i < n
```

begin

i := i + 1

total := total + i

end

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

Answer: 15

Feedback

The correct answer is: 21

Question 13

Complete

Mark 0.00 out of 1.00

Flag question

Question text

How many one-to-one functions from a set of 2 elements to a set of 5 elements?

Answer: 10

Feedback

The correct answer is: 20

Question 14

Complete

Mark 1.00 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 after 10 month.

Round to the nearest VND.

Answer: 104622

Feedback

The correct answer is: 104622

Question 15

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given f =3 f(n/2)+2, f(16)=188. Find f(4).

Answer: 20

Feedback

The correct answer is: 20

Question 1

Complete

Mark 1.00 out of 1.00

Flag question

Question text

procedure XYZ(a_1,...,a_n: integers)

k:=0

for i:=1 to n do

if a_i mod 2 = 0 then k:=a_i

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

Answer: 12

Feedback

The correct answer is: 12

Question 2

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Given the Bubble sort algorithm (studied in the textbook)

procedure Bubblesort (a_1,a_2,...,a_n: integers)

for i:=1 to n-1 do

for j:=1 to n-i do

if a_j>a_{j+1} then swap(a_j,a_{j+1})

If input = 3, 2, 4, 7, 1, 6, 5, after the first pass (with i = 1), the order of the elements in the list is:

Select one:

- a. 2, 3, 4, 1, 5, 6, 7
- b. Các lựa chọn còn lại đều sai
- c. 2, 3, 1, 4, 5, 6, 7
- d. 2, 3, 1, 4, 6, 5, 7
- e. 2, 3, 4, 1, 6, 5, 7

Feedback

The correct answer is: 2, 3, 4, 1, 6, 5, 7

Question 3

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Which are correct?

$nlog(n)$ is O(n) Answer 1 No

n^2 is O(2^n) Answer 2: Yes

2^n is O(n^2) Answer 3: No

Feedback

The correct answer is: $nlog(n)$ is O(n) → No, n^2 is O(2^n) → Yes, 2^n is O(n^2) → No

Question 4

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Given the algorithm.

procedure *f*(a_1,a_2,...,a_n: integers)

***t* : = 1**

***i* : = 1**

while ((*t* > 0) and ($i < \lfloor n/2 \rfloor$))

if* ($a_i \neq a_{n-i+1}$) *then t := 0

else i := 2i

Let n = 100. Count the number of comparisons in the worst case.

Answer: 23

Feedback

The correct answer is: 20

Question 5

Complete

Mark 1.00 out of 1.00

Flag question

Question text

A sequence of pseudorandom numbers is generated as follows

$$x_0 = 4$$

$$x_i = (6x_{i-1} + 5) \bmod 13 \text{ if } i > 0$$

Find x_6 .

Answer: 7

Feedback

The correct answer is: 7

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Suppose gcd(m, n) = $7^3\ 11^{12}$ and lcm(m, n) = $2^4\ 7^5\ 11^{13}\ 13^4$. Choose correct statements:

(i) m=$7^5\ 11^{12}13^4$ and n = $2^4\ 7^3\ 11^{13}$

(ii) m=$2^4\ 7^5\ 11^{13}\ 13^2$ and n = $7^3\ 11^{12}\ 13^2$

Select one:

- a. (ii)
- b. Both (i), (ii).
- c. (i)
- d. None of the other choices is correct

Feedback

The correct answer is: (i)

Question 7

Complete

Mark 1.00 out of 1.00

Flag question

Question text

When using the modular exponentiation algorithm to compute 6^6 mod 13, the remainders computed by successively squaring are:

Select one:

- a. 10, 9
- b. Các lựa chọn còn lại đều sai.
- c. 6, 10, 9
- d. 1, 6, 36

Feedback

The correct answer is: 6, 10, 9

Question 8

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find base 5 expansion of $(432)_7$.

Answer: 1334

Feedback

The correct answer is: 1334

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.

Assume the proposition is true for $n = k$.

Answer 1

Step 2

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

By induction, the proposition is true for all n positive integer.

The proposition is true for $n = 1$ because 1 = 1*2/2.

Step 2

Answer 2

Step 3

Answer 3

Step 4

Answer 4

Step 1

Feedback

The correct answer is: Assume the proposition is true for $n = k$. → Step 2, 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, By induction, the proposition is true for all n positive integer. → Step 4, The proposition is true for $n = 1$ because 1 = 1*2/2. → Step 1

Question 10

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Given the sequence

$a_0 = 1, a_1 = 2, a_n = 2a_{n-1} + a_{n-2}$ for $n \geq 2$

Find a_6 .

Answer: 64

Feedback

The correct answer is: 169

Question 11

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the recursive algorithm.

procedure f(n: positive integer)

if *n* = 1 then

f(n) := 1

else

f(n) := 2*f(n-1) + 1

Choose correct statement.

Select one:

- a. $f(n) = 2^{n-1}$
- b. $f(n) = 2n - 1$
- c. $f(n) = 2^n - 1$
- d. $f(n) = n$

Feedback

The correct answer is: $f(n) = 2^n - 1$

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 $i \leq n$

begin

i := i + 1

total := total + i

end

Select one:

- a. total=i(i + 1)/2 and $i \leq n$
- b. total=n(n + 1)/2 and $i \leq n+1$
- c. total=i(i + 1)/2 and $i \leq n+1$
- d. total=n(n + 1)/2 and $i \leq n$

Feedback

The correct answer is: total=i(i + 1)/2 and $i \leq n+1$

Question 13

Complete
Mark 1.00 out of 1.00

Flag question

Question text

In English alphabet, how many strings of 4 distinct characters that start with A?

Answer: 13800

Feedback

The correct answer is: 13800

Question 14

Complete
Mark 1.00 out of 1.00

Flag question

Question text

A young pair of rabbits (one of each sex) is placed on an island. A pair of rabbits does not breed until they are 2 month old. After they are 2 month old they will produce 3 pairs of rabbits each month. Find the number of pairs of rabbits after 5 months.

Answer: 19

Feedback

The correct answer is: 19

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(81).

Answer: 241

Feedback

The correct answer is: 241

Question **1**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the output value of n if input *a* = 31.
Procedure XYZ(a: integer)

n:=0

while a $\neq$ 0

n: = n + (a mod 2)

a: = $\lfloor a/2 \rfloor$

Print (n)

Answer: 5

Feedback

The correct answer is: 5

Question **2**

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Find the output of:

Greedy Change-Making Algorithm

Input: 1008 cents

Output: The total number of coins using: Quarters, Dimes, Nickles, Pennies

Answer: 44

Feedback

The correct answer is: 44

Question 3

Complete
Mark 1.00 out of 1.00

Flag question

Question text

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

$(x^2 + x - 1)^3$ Answer 1: 6

$x.\ln(x)$ Answer 2: 2

e^x Answer 3: Does not exist

Feedback

The correct answer is: $(x^2 + x - 1)^3$ → 6, $x.\ln(x)$ → 2, e^x → Does not exist

Question 4

Not answered
Marked out of 1.00

Flag question

Question text

Given the algorithm.

procedure: po (c, a_1,...,a_n: 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 + a_i*p

end

Let n = 4. Count the total number of additions and multiplications.

Answer:

Feedback

The correct answer is: 18

Question **5**

Complete

Mark 0.00 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 [13, 14, 0, 0, 2, 4].

Select one:

a. [1, 3, 19, 19, 7, 3]

- b. [8, 3, 9, 9, 23, 12]
- c. [7, 2, 13, 13, 12, 10]
- d. [15, 2, 1, 1, 18, 2]
- e. [16, 23, 3, 3, 17, 5]

Feedback

The correct answer is: [16, 23, 3, 3, 17, 5]

Question 6

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Let m=2^3 3^2 5^8 13^5 và n = 2^5 3^3 $5^5 11^2$. Choose correct statements:

(i) gcd(m, n) = 2^4 13^{90}.

(ii) gcd(m, n) = 2^3 3^3 5^3

(iii) lcm(m, n) = 2^5 3^3 5^8 11^2 13^5

(iv) lcm(m, n) = 2^3 3^2 5^5 11^2 13^5

Select one:

- a. None of the other choices is correct
- b. (i), (iii).
- c. (ii), (iv).
- d. (ii), (iii).
- e. (i), (iv).

Feedback

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

Question 7

Complete
Mark 1.00 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 = 846 and b = 238?*

Answer: 5

Feedback

The correct answer is: 5

Question 8

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find binary expansion of $(482)_{10}$

Select one:

- a. $(111100010)_2$
- b. $(111000010)_2$
- c. $(101100010)_2$
- d. $(111101010)_2$

Feedback

The correct answer is: $(111100010)_2$

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*1! + 2*2! + 3*3! + ... + n*n! = (n+1)!-1 for all n positive integer.

The proposition is true for n = 1 because 1*1! = 2!-1.

Then the proposition is also true for $n = k + 1$ because: 1*1! + 2*2!+ 3*3!+ ... + (k+1)*(k+1)! = 1*1! + 2*2!+ 3*3!+ ... + k*k!+(k+1)*(k+1)! = (k+1)!-1+ (k+1)*(k+1)! = (k+2)!-1

By induction, the proposition is true for all n positive integers.

Assume the proposition is true for $n = k$.

Answer 1: Step 1

Answer 2: Step 3

Answer 3: Step 4

Answer 4: Step 2

Feedback

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

Question 10

Not answered
Marked out of 1.00

Flag question

Question text

Given the sequence

$a_0 = 1, a_n = a_0 + a_1 + ... + a_{n-1}$ for $n \geq 1$

Find a_6 .

Answer:

Feedback

The correct answer is: 32

Question 11

Complete
Mark 0.00 out of 1.00

Flag question

Question text

How many comparisons are needed to merge two ordered lists

[2, 9, 12, 17, 20, 23] and [1, 4, 5, 6, 7, 8]

using the merge algorithm in the textbook?

Answer: 8

Feedback

The correct answer is: 7

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 < n
begin
i := i + 1
total := total + i
end
```

Select one:

a. total=$n(n+1)/2$ and i less than n

- b. total=$i(i+1)/2$ and i less than n
- c. total=$(n+1)$ và i less than or equal n
- d. total=$i(i+1)/2$ and i less than or equal n

Feedback

The correct answer is: total=$i(i+1)/2$ and i less than or equal n

Question 13

Not answered
Marked out of 1.00

Flag question

Question text

How many positive integers not exceeding 1000 and contains at least a 7?

Answer:

Feedback

The correct answer is: 271

Question 14

Not answered
Marked out of 1.00

Flag question

Question text

The number of bacteria triples every hour. If the initial number of bacteria is 50, find the number of bacteria after 5 hours.

Answer:

Feedback

The correct answer is: 12150

Question 15

Not answered
Marked out of 1.00

Flag question

Question text

Given f (n)=3 f(n/2)+2, f(8)=62. Find f(2).

Answer:

Feedback

The correct answer is: 6

Question 1

Complete

Mark 1.00 out of 1.00

Flag question

Question text

procedure TT(*n*: nguyên dương)

begin

***S*:=0;**

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

***S*:= *S*+*i*^{3};**

end

Find output value of S if input *n* = 4.

Answer: 100

Feedback

The correct answer is: 100

Question 2

Not answered

Marked out of 1.00

Flag question

Question text

The median **of a list of integers is f(d 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

[1, 2, 33, 3, 30, 8, 31, 15, 24, 131, 7]

Answer:

Feedback

The correct answer is: 15

Question 3

Complete

Mark 1.00 out of 1.00

Flag question

Question text

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

4x+5 Answer 1: 1

$x(x^2+1)$ Answer 2: 3

xln(x) Answer 3: 2

Feedback

The correct answer is: 4x+5 → 1, $x(x^2+1)$ → 3, xln(x) → 2

Question 4

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the algorithm.

procedure: XYZ(c, a_1,...,a_n: 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 + a_i*p

end

If n = 4, how many additions are used?

Answer: 6

Feedback

The correct answer is: 6

Question 5

Complete

Mark 0.00 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. [1, 6, 17, 17, 2, 9]

b. [2, 21, 23, 23, 11, 12]

c. [2, 7, 1, 1, 8, 2]

d. [2,16, 24, 24, 10, 7]

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

Suppose gcd(m, n) = $7^3\ 11^{12}$ and lcm(m, n) = $2^4\ 7^5\ 11^{13}\ 13^4$. Choose correct statements:

(i) m=$7^5\ 11^{12}13^4$ and n = $2^4\ 7^3\ 11^{13}$

(ii) m=$2^4\ 7^5\ 11^{13}\ 13^2$ and n = $7^3\ 11^{12}\ 13^2$

Select one:

a. (ii)

b. (i)

c. None of the other choices is correct

d. Both (i), (ii).

Feedback

The correct answer is: (i)

Question 7

Complete

Mark 1.00 out of 1.00

Flag question

Question text

When using the modular exponentiation algorithm to compute 3^{10} mod 7, the remainders computed by successively squaring are:

Select one:

- a. 3, 2, 4, 2
- b. 3, 4, 2, 1
- c. Các lựa chọn còn lại đều sai.
- d. 1, 3, 2, 4

Feedback

The correct answer is: 3, 2, 4, 2

Question 8

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find octal expansion of $(9D7)_{16}$.

Answer: 4727

Feedback

The correct answer is: 4727

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*1! + 2*2! + 3*3! + ... + n*n! = (n+1)!-1 for all n positive integer.

Assume the proposition is true for $n = k$.

Answer 1

Step 2

By induction, the proposition is true for all n positive integers.

Then the proposition is also true for $n = k + 1$ because: 1*1! + 2*2!+ 3*3!+ ... + (k+1)*(k+1)! = 1*1! + 2*2!+ 3*3!+ ... + k*k!+(k+1)*(k+1)! = (k+1)!-1+ (k+1)*(k+1)! = (k+2)!-1

The proposition is true for n = 1 because 1*1! = 2!-1.

Answer 2
Step 4

Answer 3
Step 3

Answer 4
Step 1

Feedback

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

Question 10

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Find f(4) if

f(0) = -1, f(1) = 2, f(n+1) = f(n) + 3f(n-1) , n = 1, 2, 3, ...

Answer: 2

Feedback

The correct answer is: 2

Question 11

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Given the recursive algorithm.

procedure f(a: real, n: positive integer)

if *n* = 1 then

f(a, n) := a

else

f(a,n) := 2*f(a,n-1) – a

Choose correct statement.

Select one:

a. $f(a, n) = (2n - 1)a$

b. $f(a, n) = na$

c. $f(a, n) = 2^n a - a$

d. $f(a, n) = a$

Feedback

The correct answer is: $f(a, n) = a$

Question **12**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the program segment.

i := 1

total := 1

while $i \leq n$

begin

i := i + 1

total := total + i

end

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

Answer: 28

Feedback

The correct answer is: 28

Question 13

Not answered
Marked out of 1.00

Flag question

Question text

How many positive integers not exceeding 100 and are divisible by neither 6 nor 9?

Answer:

Feedback

The correct answer is: 78

Question 14

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Which sequence that does NOT satisfy the recursive relation

$$a_n = 8a_{n-1} - 16a_{n-2}$$

Select one:

- a. None of the other choices is correct
- b. $a_n = 2^n$
- c. $a_n = n4^n$
- d. $a_n = 4^n$

Feedback

The correct answer is: $a_n = 2^n$

Question 15

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given f(n)=2f(n/2)+3, f(16)=53. Find f(4).

Answer: 11

Feedback

The correct answer is: 11

Question 1

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Find output value of S.

procedure sum

S:= 0

for i:=1 to 3

for j:=1 to i

S:=S + i.j

Answer: 14

Feedback

The correct answer is: 25

Question 2

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the output of:

Greedy Change-Making Algorithm

Input: 1100 cents

Output: The number of coins of each type: Quarters, Dimes, Nickles, Pennies

Select one:

- a. 45 , 2 , 1 , 0
- b. 43 , 2 , 1 , 0
- c. 44 , 0 , 0 , 0
- d. 43 , 2 , 0 , 5

Feedback

The correct answer is: 44 , 0 , 0 , 0

Question 3

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the smallest integer n such that f(x) = $O(x^n)$.

x+ln(x) Answer 1: 1

2 Answer 2: 0

x(x+1) Answer 3: 2

Feedback

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

Question 4

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the algorithm.

procedure: XYZ(c, a_1,...,a_n: 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 + a_i*p

end

Let n = 10. Count the total number of additions and multiplications.

Answer: 135

Feedback

The correct answer is: 135

Question 5

Complete

Mark 0.00 out of 1.00

Flag question

Question text

A sequence of pseudorandom numbers is generated as follows

$$x_0 = 4$$

$$x_i = (6x_{i-1} + 5) \bmod 17 \text{ if } i > 0$$

Find x_4 .

Answer: 3

Feedback

The correct answer is: 2

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let $m=2^3\ 3^2\ 5^8\ 13^5$ và $n = 2^5\ 3^3\ 5^5 11^2$. Choose correct statements:

(i) $\gcd(m, n) = 2^4\ 13^{90}$.

(ii) gcd(m, n) = $2^3\ 3^3\ 5^3$

(iii) lcm(m, n) = $2^5\ 3^3\ 5^8\ 11^2\ 13^5$

(iv) lcm(m, n) = $2^3\ 3^2\ 5^5\ 11^2\ 13^5$

Select one:

- a. (ii), (iv).
- b. (ii), (iii).
- c. (i), (iii).
- d. None of the other choices is correct
- e. (i), (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: 3

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: 126

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 + 2 + 3 + ... + n = n(n+1)/2 for *n* positive integer.

By induction, the proposition is true for all *n* positive integer. Answer 1: Step 4

The proposition is true for *n* = 1 because 1 = 1*2/2. Answer 2: Step 1

Then the proposition is also true for *n* = *k* + 1 because: 1 + 2+ 3+ ... + (k+1) = 1 + 2+ Answer 3: Step 3

3+ ... + k + (k+1) = k(k+1)/2+(k+1) = (k+1)(k+2)/2

Assume the proposition is true for $n = k$.

Answer 4

Step 2

Feedback

The correct answer is: By induction, the proposition is true for all n positive integer. → Step 4, The proposition is true for $n = 1$ because $1 = 1^*2/2$. → Step 1, 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, Assume 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

$a_0 = 1, a_1 = 2, a_n = a_{n-1} + 2a_{n-2}$ for $n \geq 2$

Find a_5

Answer: 32

Feedback

The correct answer is: 32

Question 11

Complete

Mark 1.00 out of 1.00

Flag question

Question text

How many comparisons are needed to merge two ordered lists
[2, 5, 7, 9, 12, 23] and [1, 4, 8, 32, 67]
using the merge algorithm in the textbook?

Answer: 9

Feedback

The correct answer is: 9

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: 15

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 3 nor 5?

Answer: 41

Feedback

The correct answer is: 53

Question 14

Complete

Mark 0.00 out of 1.00

Flag question

Question text

A young pair of rabbits (one of each sex) is placed on an island. A pair of rabbits does not breed until they are 2 month old. After they are 2 month old they will produce 2 pairs of rabbits each month. Find the number of pairs of rabbits after 6 months.

Answer: 40

Feedback

The correct answer is: 21

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: 79

Feedback

The correct answer is: 79

Question 1

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the output value of n if input *a* = 200.

Procedure XYZ(a: integer)

n:=0

while a $\neq$ 0

n: = n + (a mod 2)

a: = $\lfloor a/2 \rfloor$

Print(n)

Answer: 3

Feedback

The correct answer is: 3

Question 2

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the output of:

Greedy Change-Making Algorithm

Input: 1068 cents

Output: The number of coins of each type: Quarters, Dimes, Nickles, Pennies

Select one:

- a. 43 , 0 , 1 , 2
- b. 42 , 1 , 1 , 3
- c. 42 , 1 , 0 , 8
- d. 41 , 4 , 0 , 3

Feedback

The correct answer is: 42 , 1 , 1 , 3

Question 3

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Which are correct?

2log n is O (n) Answer 1: Yes

nlog(n) is O(n) Answer 2: No

2n is O(log n) Answer 3: No

Feedback

The correct answer is: 2log n is O (n) → Yes, nlog(n) is O(n) → No, 2n is O(log n) → No

Question 4

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the algorithm.

procedure: po (c, a_1,...,a_n: 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 + a_i*p*

end

Let n = 4. Count the total number of additions and multiplications.

Answer: 18

Feedback

The correct answer is: 18

Question 5

Complete

Mark 1.00 out of 1.00

Flag question

Question text

A sequence of pseudorandom numbers is generated as follows

$$x_0 = 5$$

$$x_i = (7x_{i-1} + 10) \bmod 17 \text{ if } i > 0$$

Find x_4 .

Answer: 8

Feedback

The correct answer is: 8

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let $m=7^5\ 11^{12}\ 13^{90}$ and $n = 2^4\ 7^3\ 11^{14}$. Choose correct statements:

(i) gcd(m, n) = $2^4\ 13^{90}$

(ii) gcd(m, n) = $7^3\ 11^{12}$

(iii) lcm(m, n) = $2^4\ 7^5\ 11^{14}\ 13^{90}$

Select one:

- a. (i), (ii).
- b. (ii).
- c. (i), (ii), (iii).
- d. (ii), (iii).
- e. None of the other choices is correct

Feedback

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

Question 7

Complete

Mark 1.00 out of 1.00

Flag question

Question text

When using the modular exponentiation algorithm to compute 2^7 mod 7, the remainders computed by successively squaring are:

Select one:

a. Các lựa chọn còn lại đều sai.

b. 1, 2, 4

c. 2, 4, 2

d. 2, 4, 6

Feedback

The correct answer is: 2, 4, 2

Question 8

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find base 7 expansion of $(430)_5$.

Answer: 223

Feedback

The correct answer is: 223

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

$1 + 3 + 5 + \ldots + (2n - 1) = n^2$ for n positive integer.

By induction, the proposition is true for all n positive integer.

Answer 1: Step 4

The proposition is true for $n = 1$ because $1 = 1^2$.

Answer 2: Step 1

Then the proposition is also true for $n = k + 1$ because: $1 + 3 + 5 + \ldots + (2(k+1) - 1) = 1 + 3 + 5 + \ldots + (2k - 1) + (2k+1) = k^2 + 2k + 1 = (k+1)^2$

Answer 3: Step 3

Assume that the proposition is true for $n = k$.

Answer 4: Step 2

Feedback

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

$a_0 = 1, a_1 = 2, a_n = a_{n-1} + 2a_{n-2}$ for $n \geq 2$

Find a_6 .

Answer: 64

Feedback

The correct answer is: 64

Question 11

Complete

Mark 1.00 out of 1.00

Flag question

Question text

How many comparisons are needed to merge two ordered lists
[2, 9, 12, 17, 20, 23] and [1, 4, 5, 6, 7, 8]
using the merge algorithm in the textbook?

Answer: 7

Feedback

The correct answer is: 7

Question 12

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Choose a loop invariant in the program segment.
i := 1
total := 1

while $i \leq n$

begin

i := i + 1

total := total + i

end

Select one:

- a. total=n(n + 1)/2 and $i \leq n$
- b. total=i(i + 1)/2 and $i \leq n$
- c. total=n(n + 1)/2 and $i \leq n+1$
- d. total=i(i + 1)/2 and $i \leq n+1$

Feedback

The correct answer is: total=i(i + 1)/2 and $i \leq n+1$

Question 13

Complete

Mark 0.00 out of 1.00

Flag question

Question text

How many positive integers less than 1000 and contains at least a 0?

Answer: 162

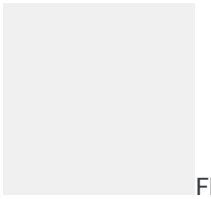
Feedback

The correct answer is: 180

Question 14

Complete

Mark 0.75 out of 1.00


Flag question

Question text

Determine if each sequence satisfies the recursive relation

$a_n = 3a_{n-1} - 2a_{n-2},\ n = 3,4,\ldots$

$a_n = n^2,\ n = 1,2,3,\ldots$ Answer 1 [No]

$a_n = 2,\ n = 1,2,3,\ldots$ Answer 2 [Yes]

$a_n = 2^n,\ n = 1,2,3,\ldots$ Answer 3 [Yes]

$a_n = 1,\ n = 1,2,3,\ldots$ Answer 4 [No]

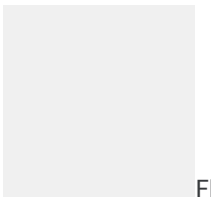
Feedback

The correct answer is: $a_n = n^2,\ n = 1,2,3,\ldots$ → No, $a_n = 2,\ n = 1,2,3,\ldots$ → Yes, $a_n = 2^n,\ n = 1,2,3,\ldots$ → Yes, $a_n = 1,\ n = 1,2,3,\ldots$ → Yes

Question 15

Complete

Mark 1.00 out of 1.00


Flag question

Question text

Given = 2.f(\sqrt{n}) + log_2n, f(2) = 1" alt="f = 2.f(\sqrt{n}) + log_2n, f(2) = 1" src="https://cmshn.fpt.edu.vn/filter/tex/pix.php/33b55803ab1cc70500d5f8f8dc28859c.png" />. Find f(16).

Answer: 12

Feedback

The correct answer is: 12

Question 1

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find output value of S.

procedure tong

S:= 0

for i:=1 to 3

for j:=i to 3

S:=S + i + j

Answer: 24

Feedback

The correct answer is: 24

Question 2

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the output of:

Greedy Change-Making Algorithm

Input: 1069 cents

Output: The total number of coins using: Quarters, Dimes, Nickles, Pennies

Answer: 48

Feedback

The correct answer is: 48

Question 3

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the smallest integer n such that f(x) = $O(x^n)$.

e^x Answer 1: Does not exist

$x.\ln(x)$ Answer 2: 2

$(x^2 + x - 1)^3$ Answer 3: 6

Feedback

The correct answer is: e^x → Does not exist, $x.\ln(x)$ → 2, $(x^2 + x - 1)^3$ → 6

Question 4

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the algorithm.

procedure: po (c, a_1,...,a_n: 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 + a_i*p

end

Let n = 4. Count the number of multiplications.

Answer: 12

Feedback

The correct answer is: 12

Question 5

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let a = -213 div 13 and b = -213 mod 13. Find a+b.

Answer: -9

Feedback

The correct answer is: -9

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let $m=7^5\ 11^{12}\ 13^{90}$ and $n = 2^4\ 7^3\ 11^{14}$. Choose correct statements:

(i) $\gcd(m, n) = 2^4\ 13^{90}$

(ii) $\gcd(m, n) = 7^3\ 11^{12}$

(iii) $\text{lcm}(m, n) = 2^4\ 7^5\ 11^{14}\ 13^{90}$

Select one:

- a. (i), (ii).
- b. (ii).
- c. (ii), (iii).
- d. None of the other choices is correct
- e. (i), (ii), (iii).

Feedback

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

Question 7

Complete

Mark 1.00 out of 1.00

Flag question

Question text

When using the modular exponentiation algorithm to compute 2^7 mod 7, the remainders computed by successively squaring are:

Select one:

- a. 2, 4, 2
- b. Các lựa chọn còn lại đều sai.
- c. 2, 4, 6
- d. 1, 2, 4

Feedback

The correct answer is: 2, 4, 2

Question 8

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find octal expansion of $(987)_{16}$.

Answer: 4607

Feedback

The correct answer is: 4607

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*1! + 2*2! + 3*3! + ... + n*n! = (n+1)!-1 for all n positive integer.

Assume the proposition is true for $n = k$.

Answer 1: Step 2

The proposition is true for n = 1 because 1*1! = 2!-1.

Answer 2: Step 1

By induction, the proposition is true for all n positive integers.

Answer 3: Step 4

Then the proposition is also true for $n = k + 1$ because: 1*1! + 2*2!+ 3*3!+ ... + (k+1)*(k+1)! = 1*1! + 2*2!+ 3*3!+ ... + k*k!+(k+1)*(k+1)! = (k+1)!-1+(k+1)*(k+1)! = (k+2)!-1

Answer 4: Step 3

Feedback

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

Question 10

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the sequence

$a_0 = 1, a_1 = 2, a_n = 2a_{n-1} + a_{n-2}$ for $n = 2, 3, 4, \ldots$

Find a_5 .

Answer: 70

Feedback

The correct answer is: 70

Question **11**

Complete

Mark 1.00 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-1}

b. a*n

c. a^{n}

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 := 1

while $i \leq n$

begin

i := i + 1

total := total + i

end

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

Answer: 28

Feedback

The correct answer is: 28

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: 400

Feedback

The correct answer is: 600

Question 14

Complete

Mark 0.75 out of 1.00

Flag question

Question text

Determine if each sequence satisfies the recursive relation

$a_n = 4a_{n-1} - 3a_{n-2},\ n = 3,4,\ldots$

$a_n = n,\ n = 1,2,3,\ldots$ Answer 1: No

$a_n = 0,\ n = 1,2,3,\ldots$ Answer 2: Yes

$a_n = 1,\ n = 1,2,3,\ldots$ Answer 3: Yes

$a_n = 3^n$, $n = 1,2,3,\ldots$ Answer 4 No

Feedback

The correct answer is: $a_n = n$, $n = 1,2,3,\ldots$ → No, $a_n = 0$, $n = 1,2,3,\ldots$ → Yes, $a_n = 1$, $n = 1,2,3,\ldots$ → Yes, $a_n = 3^n$, $n = 1,2,3,\ldots$ → Yes

Question 15

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given f (n)=3 f(n/2)+1, f (1)=1. Find f(8).

Answer: 40

Feedback

The correct answer is: 40

Question 1

Complete

Mark 1.00 out of 1.00

Flag question

Question text

procedure XYZ(a_1,...,a_n: integers)
k:=0

for i:=1 to n do

if a_i mod 2 = 0 then k:=k+a_i

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

Answer: 28

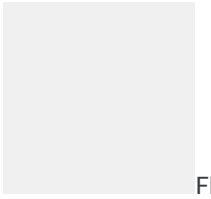
Feedback

The correct answer is: 28

Question **2**

Complete

Mark 1.00 out of 1.00


Flag question

Question text

The Binary search algorithm (studied in the textbook) successively divide the list into two sublists.

procedure BinarySearch ($a_1<a_2<...<a_n$, x: integers)

i:=1

j:=n

while (i<j)

m:= $\lfloor (i+j)/2 \rfloor$

if x>a_m then i:=m+1

else j:=m

if x = a_i then location:= i

else location:=0

If input = 2, 4, 5, 7, 8, 9, 10, 13 and x = 6, after the second time of dividing into sublists, the sublist to be considered is:

Select one:

- a. Các lựa chọn còn lại đều sai
- b. 7, 8, 9
- c. 5, 7
- d. 2, 4, 5

e. 5, 7, 8

Feedback

The correct answer is: 5, 7

Question 3

Complete

Mark 1.00 out of 1.00

Flag question

Question text

3n is O(n+log(n))	Answer 1	Yes
n+log(n) is O(log(n))	Answer 2	No
n+log(n) is O(n)	Answer 3	Yes

Feedback

The correct answer is: 3n is O(n+log(n)) → Yes, n+log(n) is O(log(n)) → No, n+log(n) is O(n) → Yes

Question 4

Not answered

Marked out of 1.00

Flag question

Question text

Given the algorithm.

procedure *f*(a_1,a_2,…,a_n: integers, *n*: *integer* > 2, *x*: integer)

***i* := 1**

while (*i* < *n* and $a_i + a_{n-i} \neq x$)

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

if (*i* < *n*) then *output* := *i*

else *output* := 0

***Let n* = 100. Count the number of additions in the worst case.**

Answer:

Feedback

The correct answer is: 198

Question 5

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Let a = -215 div 14 and b = -215 mod 14. Find a+b.

Answer: -6

Feedback

The correct answer is: -7

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let $m=2^3\ 3^2\ 5^8\ 13^5$ và $n = 2^5\ 3^3\ 5^5 11^2$. Choose correct statements:

(i) gcd(m, n) = $2^4\ 13^{90}$.

(ii) gcd(m, n) = $2^3\ 3^3\ 5^3$

(iii) lcm(m, n) = $2^5\ 3^3\ 5^8\ 11^2\ 13^5$

(iv) lcm(m, n) = $2^3\ 3^2\ 5^5\ 11^2\ 13^5$

Select one:

a. None of the other choices is correct

- b. (i), (iii).
- c. (ii), (iv).
- d. (ii), (iii).
- e. (i), (iv).

Feedback

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

Question 7

Complete
Mark 1.00 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 = 846 and b = 238?*

Answer: 5

Feedback

The correct answer is: 5

Question 8

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Find octal expansion of $(BD5)_{16}$.

Answer: 5725

Feedback

The correct answer is: 5725

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.

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 1: Step 3

The proposition is true for $n = 1$ because $1 = 1*2/2$.

Answer 2: Step 1

Assume the proposition is true for $n = k$.

Answer 3: Step 2

By induction, the proposition is true for all n positive integer.

Answer 4: Step 4

Feedback

The correct answer is: 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, 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

Question 10

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Given the sequence

$a_n = a^2_{n-1}-1$ and $a_0 = 2$.

Find a_4.

Answer: 3968

Feedback

The correct answer is: 3968

Question 11

Complete

Mark 1.00 out of 1.00

Flag question

Question text

How many comparisons are needed to merge two ordered lists

[2, 5, 7, 9, 12, 23] and [1, 4, 8, 32, 67]

using the merge algorithm in the textbook?

Answer: 9

Feedback

The correct answer is: 9

Question 12

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Choose a loop invariant in the program segment.

```
i := 1
total := 1
while i < n
begin
i := i + 1
total := total + i
```

end

Select one:

- a. total=$n(n+1)/2$ and i less than n
- b. total=$(n+1)$ và i less than or equal n
- c. total=$i(i+1)/2$ and i less than or equal n
- d. total=$i(i+1)/2$ and i less than n

Feedback

The correct answer is: total=$i(i+1)/2$ and i less than or equal n

Question 13

Complete
Mark 0.00 out of 1.00

Flag question

Question text

In English alphabet, how many strings of 4 distinct characters that do not contain A ?

Answer: 13800

Feedback

The correct answer is: 303600

Question 14

Complete
Mark 1.00 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 after 6 month.

Round to the nearest VND.

Answer: 61520

Feedback

The correct answer is: 61520

Question 15

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given f (n)=3 f(n/2)+1, f (1)=1. Find f(16).

Answer: 121

Feedback

The correct answer is: 121

Question 1

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the output value of n if input *a* = 200.

Procedure XYZ(a: integer)

n:=0

while a $\neq$ 0

n: = n + (a mod 2)

a: = $\lfloor a/2 \rfloor$

Print(n)

Answer: 3

Feedback

The correct answer is: 3

Question 2

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the output of:

Greedy Change-Making Algorithm

Input: 1008 cents

Output: The number of coins of each type: Quarters, Dimes, Nickles, Pennies

Select one:

- a. 39 , 3 , 0 , 3
- b. 40, 0 , 1 , 3
- c. 40 , 1 , 0 , 0
- d. 40 , 1 , 0 , -2

Feedback

The correct answer is: 40, 0 , 1 , 3

Question 3

Complete

Mark 1.00 out of 1.00

Flag question

Question text

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

$x^2+ln(x)$ Answer 1: 2

$(x^2+x-1)/(x+3)$ Answer 2: 1

$x^2ln(x)$ Answer 3: 3

Feedback

The correct answer is: $x^2+ln(x)$ → 2, $(x^2+x-1)/(x+3)$ → 1, $x^2ln(x)$ → 3

Question 4

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the algorithm.

procedure *f*(a_1,a_2,…,a_n)

***t* : = 1**

i : = 1

while ((*t* > 0) and ($i < \lfloor n/2 \rfloor$))

if ($a_i \neq a_{n-i+1}$) *then t := 0*

else i := 2i

Let n = 200. Count the number of comparisons used in the worst case.

Answer: 23

Feedback

The correct answer is: 23

Question 5

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Let a = -213 div 15 and b = -213 mod 15. Find a+b.

Answer: -2

Feedback

The correct answer is: -3

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Suppose gcd(m, n) = $7^3\ 11^{12}$ and lcm(m, n) = $2^4\ 7^5\ 11^{13}\ 13^4$. Choose correct statements:

(i) m=$7^5\ 11^{12}13^4$ and n = $2^4\ 7^3\ 11^{13}$

(ii) m=$2^4\ 7^5\ 11^{13}\ 13^2$ and n = $7^3\ 11^{12}\ 13^2$

Select one:

- a. Both (i), (ii).
- b. (i)
- c. None of the other choices is correct
- d. (ii)

Feedback

The correct answer is: (i)

Question 7

Complete

Mark 1.00 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: 3

Feedback

The correct answer is: 3

Question 8

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find octal expansion of $(9D7)_{16}$.

Answer: 4727

Feedback

The correct answer is: 4727

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

$1 + 3 + 5 + \ldots + (2n - 1) = n^2$ for n positive integer.

Then the proposition is also true for $n = k + 1$ because: $1 + 3 + 5 + \ldots + (2(k+1) - 1) = 1 + 3 + 5 + \ldots + (2k - 1) + (2k+1) = k^2 + 2k + 1 = (k+1)^2$

Answer 1: Step 3

The proposition is true for $n = 1$ because $1 = 1^2$.

Answer 2: Step 1

By induction, the proposition is true for all n positive integer.

Answer 3: Step 4

Assume that the proposition is true for $n = k$.

Answer 4: Step 2

Step 2

Feedback

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

$a_0 = 1, a_n = a_0 + a_1 + \ldots + a_{n-1}$ **for** $n = 1, 2, 3, \ldots$

Find a_5 **.**

Answer: 16

Feedback

The correct answer is: 16

Question 11

Complete

Mark 1.00 out of 1.00

Flag question

Question text

How many comparisons are needed to merge two ordered lists
[2, 9, 12, 17, 20, 23] and [1, 4, 5, 6, 7, 8, 30]
using the merge algorithm in the textbook?

Answer: 12

Feedback

The correct answer is: 12

Question 12

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the program segment.

```
i := 1
total := 1
while i < n
begin
i := i + 1
total := total + i
end
```

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

Answer: 21

Feedback

The correct answer is: 21

Question 13

Complete

Mark 0.00 out of 1.00

Flag question

Question text

How many one-to-one functions from a set of 5 elements to a set of 2 elements?

Answer: 10

Feedback

The correct answer is: 0

Question 14

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find the general formula of the sequence

$a_n = 3a_{n-1}, a_0 = 2$

Select one:

- a. $a_n = 2.3^n$
- b. $a_n = 3.2^n$
- c. None of the other choices is correct

d. $a_n = 2.3^{n-1}$

e. $a_n = 2+3n$

Feedback

The correct answer is: $a_n = 2.3^n$

Question 15

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given f(n)=2f(n/2)+3, f(16)=53. Find f(4).

Answer: 11

Feedback

The correct answer is: 11

Question 1

Complete

Mark 1.00 out of 1.00

Flag question

Question text

procedure XYZ(a_1,...,a_n: integers)
k:=0

for i:=1 to n do

if a_i mod 2 = 0 then k:=k+a_i

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

Answer: 28

Feedback

The correct answer is: 28

Question 2

Complete

Mark 0.00 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 (a_1,a_2,...,a_n: integers)
Max: =a_1
for i : = 2 to n do

if Max < a_i then Max: = a_i

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. Các lựa chọn còn lại đều sai
- d. 4, 5, 9, 7
- e. 4, 1, 5, 9

Feedback

The correct answer is: 4, 5, 9

Question 3

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Which are correct?

$n!$ is O(2^n) Answer 1: No

$n^2+nlog(n)$ is O(nlog(n)) Answer 2: No

2^n is O($n!$) Answer 3: Yes

Feedback

The correct answer is: $n!$ is O(2^n) → No, $n^2+nlog(n)$ is O(nlog(n)) → No, 2^n is O($n!$) → Yes

Question **4**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the algorithm.

procedure: XYZ(c, a_1,...,a_n: 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 + a_i*p

end

Let n = 10. Count the number of additions.

Answer: 45

Feedback

The correct answer is: 45

Question 5

Complete

Mark 1.00 out of 1.00

Flag question

Question text

A sequence of pseudorandom numbers is generated as follows

$$x_0 = 5$$

$$x_i = (7x_{i-1} + 10) \bmod 17 \text{ if } i > 0$$

Find x_5 .

Answer: 15

Feedback

The correct answer is: 15

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let $m=2^3\ 3^2\ 5^8\ 13^5$ và $n = 2^5\ 3^3\ 5^5 11^2$. Choose correct statements:

(i) gcd(m, n) = $2^4\ 13^{90}$.

(ii) gcd(m, n) = $2^3\ 3^3\ 5^3$

(iii) lcm(m, n) = $2^5\ 3^3\ 5^8\ 11^2\ 13^5$

(iv) lcm(m, n) = $2^3\ 3^2\ 5^5\ 11^2\ 13^5$

Select one:

- a. (ii), (iii).
- b. (i), (iii).
- c. (ii), (iv).
- d. (i), (iv).
- e. None of the other choices is correct

Feedback

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

Question 7

Complete
Mark 1.00 out of 1.00

Flag question

Question text

When using the modular exponentiation algorithm to compute 3^{10} mod 7, the remainders computed by successively squaring are:

Select one:

- a. 1, 3, 2, 4
- b. Các lựa chọn còn lại đều sai.
- c. 3, 2, 4, 2
- d. 3, 4, 2, 1

Feedback

The correct answer is: 3, 2, 4, 2

Question 8

Complete
Mark 1.00 out of 1.00

Flag question

Question text

Find octal expansion of $(ABC)_{16}$.

Answer: 5274

Feedback

The correct answer is: 5274

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

$1 + 3 + 5 + \ldots + (2n - 1) = n^2$ for n positive integer.

The proposition is true for $n = 1$ because $1 = 1^2$.

By induction, the proposition is true for all n positive integer.

Assume that the proposition is true for $n = k$.

Then the proposition is also true for $n = k + 1$ because: $1 + 3 + 5 + \ldots + (2(k+1) - 1) = 1 + 3 + 5 + \ldots + (2k - 1) + (2k+1) = k^2 + 2k + 1 = (k+1)^2$

Answer 1: Step 1

Answer 2: Step 4

Answer 3: Step 2

Answer 4: Step 3

Feedback

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

Question 10

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the sequence

$a_0 = 1, a_1 = 2, a_n = a_{n-1} + 2a_{n-2}$ *for* $n \geq 2$
Find a_7 **.**

Answer: 128

Feedback

The correct answer is: 128

Question **11**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

How many comparisons are needed to merge two ordered lists

[2, 9, 12, 20, 23] and [3, 4, 5, 6, 7, 8, 17]

using the merge algorithm in the textbook?

Answer: 10

Feedback

The correct answer is: 10

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: 15

Feedback

The correct answer is: 15

Question 13

Complete

Mark 1.00 out of 1.00

Flag question

Question text

How many bit strings of length 6 that either start with an 1 or end with 0?

Answer: 48

Feedback

The correct answer is: 48

Question 14

Complete

Mark 0.00 out of 1.00

Flag question

Question text

A young pair of rabbits (one of each sex) is placed on an island. A pair of rabbits does not breed until they are 2 month old. After they are 2 month old they will produce 2 pairs of rabbits each month. Find the number of pairs of rabbits after 5 months.

Answer: 4

Feedback

The correct answer is: 11

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(81).

Answer: 241

Feedback

The correct answer is: 241

Finish review

Question 1

Complete

Mark 0.00 out of 1.00

Flag question

Question text

procedure XYZ(a_1,...,a_n: integers)

k:=0

for i:=1 to n do

if a_i mod 2 = 0 then k:=a_i

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

Answer: 28

Feedback

The correct answer is: 12

Question 2

Complete

Mark 0.00 out of 1.00

Flag question

Question text

Given the Bubble sort algorithm (studied in the textbook)

procedure Bubblesort (a_1,a_2,...,a_n: integers)

for i:=1 to n-1 do

for j:=1 to n-i do

if a_j>a_{j+1} then swap(a_j,a_{j+1})

If input = 3, 2, 6, 4, 5, 1, after the second pass (with i = 2), the order of the elements in the list is:

Select one:

- a. 2, 3, 4, 5, 1, 6
- b. 2, 3, 1, 4, 5, 6
- c. 2, 1, 4, 3, 5, 6
- d. 2, 3, 4, 1, 5, 6
- e. Các lựa chọn còn lại đều sai

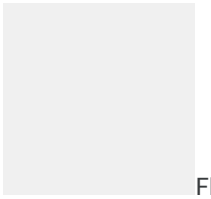
Feedback

The correct answer is: 2, 3, 4, 1, 5, 6

Question 3

Complete

Mark 1.00 out of 1.00


Flag question

Question text

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

$(x^3 - x^2 + x - 1)^3$ Answer 1: 9

2^x Answer 2: Does not exist

$2x^3.\ln(x)$ Answer 3: 4

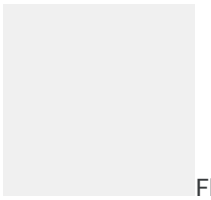
Feedback

The correct answer is: $(x^3 - x^2 + x - 1)^3$ → 9, 2^x → Does not exist, $2x^3.\ln(x)$ → 4

Question 4

Complete

Mark 1.00 out of 1.00


Flag question

Question text

Given the algorithm.

procedure *f*(a_1,a_2,...,a_n: integers)

***t* : = 1**

***i* : = 1**

while ((*t* > 0) and ($i < \lfloor n/2 \rfloor$))

if* ($a_i \neq a_{n-i+1}$) *then t := 0

else i := 2i

Let n = 100. Count the number of comparisons in the worst case.

Answer: 20

Feedback

The correct answer is: 20

Question 5

Complete

Mark 1.00 out of 1.00

Flag question

Question text

A sequence of pseudorandom numbers is generated as follows

$$x_0 = 4$$

$$x_i = (6x_{i-1} + 5) \bmod 13 \text{ if } i > 0$$

Find x_5 .

Answer: 9

Feedback

The correct answer is: 9

Question 6

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Let $m=7^5\ 11^{12}\ 13^{90}$ and $n = 2^4\ 7^3\ 11^{14}$. Choose correct statements:

(i) gcd(m, n) = $2^4\ 13^{90}$

(ii) gcd(m, n) = $7^3\ 11^{12}$

(iii) lcm(m, n) = $2^4\ 7^5\ 11^{14}\ 13^{90}$

Select one:

- a. (i), (ii).
- b. (i), (ii), (iii).
- c. None of the other choices is correct
- d. (ii).
- e. (ii), (iii).

Feedback

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

Question 7

Complete

Mark 1.00 out of 1.00

Flag question

Question text

When using the modular exponentiation algorithm to compute 6^6 mod 13, the remainders computed by successively squaring are:

Select one:

- a. 6, 10, 9
- b. Các lựa chọn còn lại đều sai.

c. 1, 6, 36

d. 10, 9

Feedback

The correct answer is: 6, 10, 9

Question 8

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Find octal expansion of $(B5D)_{16}$.

Answer: 5535

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*1! + 2*2! + 3*3! + ... + n*n! = (n+1)!-1 for all n positive integer.

The proposition is true for n = 1 because 1*1! = 2!-1.

Answer 1: Step 1

Then the proposition is also true for $n = k + 1$ because: 1*1! + 2*2!+ 3*3!+ ... + (k+1)*(k+1)! = 1*1! + 2*2!+ 3*3!+ ... + k*k!+(k+1)*(k+1)! = (k+1)!-1+(k+1)*(k+1)! = (k+2)!-1

Answer 2: Step 3

Assume the proposition is true for $n = k$.

Answer 3: Step 2

By induction, the proposition is true for all n positive integers.

Answer 4: Step 4

Feedback

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

Question 10

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given the sequence

$a_0 = 1, a_n = a_0 + a_1 + \ldots + a_{n-1}$ **for** $n \geq 1$

Find a_6 **.**

Answer: 32

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 f(n: positive integer)

if *n* = 1 then

f(n) := 1

else

f(n) := 2*f(n-1) + 1

Choose correct statement.

Select one:

a. $f(n) = 2n - 1$

b. $f(n) = n$

c. $f(n) = 2^n - 1$

d. $f(n) = 2^{n-1}$

Feedback

The correct answer is: $f(n) = 2^n - 1$

Question 12

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Choose a loop invariant in the program segment.

i := 1

total := 1

while $i \leq n$

begin

i := i + 1

total := total + i

end

Select one:

- a. total=n(n + 1)/2 and $i \leq n$
- b. total=i(i + 1)/2 and $i \leq n$
- c. total=i(i + 1)/2 and $i \leq n+1$
- d. total=n(n + 1)/2 and $i \leq n+1$

Feedback

The correct answer is: total=i(i + 1)/2 and $i \leq n+1$

Question 13

Complete

Mark 1.00 out of 1.00

Flag question

Question text

How many positive integers not exceeding 100 and are divisible by 3 but not by 5?

Answer: 27

Feedback

The correct answer is: 27

Question 14

Complete

Mark 1.00 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: 10936

Feedback

The correct answer is: 10937

Question 15

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given f (n)=3 f(n/2)+2, f(8)=62. Find f(2).

Answer: 6

Feedback

The correct answer is: 6

How many positive integers not exceeding 100 and are divisible by neither 2 nor 5?

Answer: 60

Feedback

The correct answer is: 40

Question 15

Complete

Mark 1.00 out of 1.00

Flag question

Question text

Given $f(n) = 2.f(\sqrt{n})^2 + 1, f(2) = 1$ **. Find f(16).**

Answer: 19

Feedback

The correct answer is: 19