Mate-Info Contest – March 21st 2026
Written test for Computer Science

IMPORTANT NOTE:

Unless otherwise specified:

- All arithmetic operations are performed on unlimited data types (there is no overflow / underflow).
- Arrays, matrices and strings are indexed starting from 1.
- All restrictions apply to the values of the actual parameters at the time of the initial call.
- A sub-array of an array or a string consists of elements that occupy consecutive positions in the array or in the string.
- If on the same row there are several consecutive assignment statements, they are separated by "; "

1. Consider the variables $a = 5$, $b = 6$, $c = 7$ and $d = 8$. Let | be the bitwise **OR** operation and let & be the bitwise **AND** operation.

Which of the following expressions have the value 8?

- A. $(a \mid b) + (c \,\&\, d)$
- B. $(a \mid (b + c)) \,\&\, d$
- C. $a \mid (b + (c \,\&\, d))$
- D. $((a \mid b) + c) \,\&\, d$

2. Consider the algorithm cevaFace(n), where n is a natural number ($10 \leq n \leq 10^6$):

```
Algorithm cevaFace(n):
    rez ← 1
    uc ← n MOD 10
    While n ≥ 10 execute
        n ← n DIV 10
    EndWhile
    For i ← 1, uc execute
        rez ← rez * n
    EndFor
    Return rez
EndAlgorithm
```

Which of the following statements are true?

- A. After the call cevaFace(12345) the algorithm returns 5.
- B. The algorithm cevaFace(n) returns the least significant digit of number n raised to the power given by its most significant digit.
- C. After the call cevaFace(175439) the algorithm returns 1.
- D. The algorithm cevaFace(n) returns the most significant digit of number n raised to the power given by its least significant digit.

3. Consider the natural number n ($1 \leq n \leq 10$).

Which of the following F(n, i, P) algorithms return n! after the call F(n, 1, 1)?

A.
```
Algorithm F(n, i, P):
    If n = i then
        Return P
    EndIf
    Return F(n, i + 1, P * (i + 1))
EndAlgorithm
```

B.
```
Algorithm F(n, i, P):
    If n = i then
        Return P
    EndIf
    Return F(n, i, P * i)
EndAlgorithm
```

C.
```
Algorithm F(n, i, P):
    If i = n then
        Return P
    EndIf
    j ← i + 1
    Q ← P * i
    Return F(n, j, Q)
EndAlgorithm
```

D.
```
Algorithm F(n, i, P):
    If i = n then
        Return P
    EndIf
    j ← i + 1
    Q ← P * j
    Return F(n, j, Q)
EndAlgorithm
```

4. Consider the algorithm f(A, n), where *n* is a natural number ($1 \leq n \leq 10^3$), and *A* is an array with *n* integer numbers ($0 \leq A[i] \leq 10^5$, $1 \leq i \leq n$).

```
Algorithm f(A, n):
    If n = 0 then
        Return 0
    EndIf
    Return f(A, n - 1) + (A[n] MOD 2) * (A[n] DIV 10 MOD 2)
EndAlgorithm
```

Which of the following statements are true?

   A. After the call f([23, 213, 123, 53, 97, 546, 768], 7), the algorithm returns 3.
   B. After the call f([77, 3, 657, 345, 123, 789, 45], 7), the algorithm returns 3.
   C. The algorithm returns the number of elements from the array that have at least 2 digits.
   D. After the call f([11, 31, 5, 37, 9], 5), the algorithm returns 3.

5. A computer science book has its pages numbered from 1 to *n* ($100 < n < 500$). On pages that are multiples of 3, but not multiples of 4, there are 2 solved problems. On pages that are multiples of 4, but not multiples of 3, there are 3 solved problems. All the other pages contain only theory.

Which pairs of formulas compute the number of pages containing only theory, denoted by *T* and the total number of solved problems, denoted by *P*?

   A. T ← n - (n DIV 3 + n DIV 4 - n DIV 12)
       P ← 2 * (n DIV 3 - n DIV 12) + 3 * (n DIV 4 - n DIV 12)
   B. T ← n - ((n DIV 3 - n DIV 12) + (n DIV 4 - n DIV 12))
       P ← 2 * (n DIV 3 - n DIV 12) + 3 * (n DIV 4 - n DIV 12)
   C. T ← n - (n DIV 3 + n DIV 4)
       P ← 2 * (n DIV 3) + 3 * (n DIV 4)
   D. T ← n - (n DIV 3 + n DIV 4 - n DIV 6)
       P ← 2 * (n DIV 3 - n DIV 6) + 3 * (n DIV 4 - n DIV 6)

6. Consider the algorithm f(n), where *n* is a natural number ($1 \leq n < 20$).

```
Algorithm f(n):
    x ← 0
    For i ← 1, n execute
        temp ← i
        p ← 1
        While temp > 0 execute
            p ← p * 10
            temp ← temp DIV 10
        EndWhile
        x ← x * p + i
    EndFor
    Return x
EndAlgorithm
```

Which of the following statements are true?

   A. For the values of *n* that are divisible by 3, the algorithm f(n) returns a value that is divisible by 3.
   B. The algorithm always returns a number containing exactly *n* digits.
   C. There is no value *n* such that the value returned by algorithm f(n) is divisible by both 3 and 5.
   D. The value returned by algorithm f(n) has the same parity as *n*.

7. Consider the algorithm h(n, k), where *n* and *k* are natural numbers ($1 \leq n, k \leq 10^5$).

```
Algorithm h(n, k):
    If n < k then
        Return n
    EndIf
    If n MOD k = 0 then
        Return k
    EndIf
    Return h(n - k, k)
EndAlgorithm
```

What is the value returned after the call h(2000, 21)?

   A. 2000
   B. 21
   C. 5
   D. After the call h(2000, 21) the algorithm does not terminate.

8. Consider the algorithm f(k), where **k** is a natural number $(1 \leq k \leq 10^4)$.

```
Algorithm f(k):
    x ← 0; i ← 1
    While i ≤ 2 * k + 1 execute
        x ← x + i
        i ← i + 2
    EndWhile
    Return x
EndAlgorithm
```

Which of the following statements are true?

A. After the call f(10), the value 123 is returned.
B. For any value **k**, the returned value is even.
C. After the call f(3), the value 15 is returned.
D. After the call f(21), the value 484 is returned.

9. Which of the following numbers given in base 10 are palindromes if they are represented in base 2?

A. $515_{(10)}$ B. $1967_{(10)}$ C. $1057_{(10)}$ D. $2973_{(10)}$

10. Consider the algorithm s(arr, n, x), where **n** is a natural number $(1 \leq n \leq 10^3)$, **arr** is an array containing **n** natural numbers ($arr[1]$, $arr[2]$, ..., $arr[n]$, $0 \leq arr[i] \leq 10^3$, for $i = 1, 2, ..., n$), and **x** is a natural number $(0 \leq x \leq 10^3)$:

```
Algorithm s(arr, n, x):
    st ← 1
    dr ← n
    p ← -1
    While st ≤ dr execute
        m ← (st + dr) DIV 2
        If arr[m] = x then
            p ← m
            st ← m + 1
        Else
            If arr[m] < x then
                st ← m + 1
            Else
                dr ← m - 1
            EndIf
        EndIf
    EndWhile
    Return p
EndAlgorithm
```

Which of the following statements are true?

A. The algorithm s(arr, n, x) has a time complexity of $O(\log \log n)$.
B. After the call s([10, 20, 30, 40, 50, 60, 70], 7, 20) the algorithm returns 2.
C. After the call s([10, 20, 30, 40, 50, 60, 70], 7, 35) the algorithm returns -1.
D. After the call s([1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 4], 11, 4) the algorithm returns 11.

11. Consider the algorithm eCrescatoare(a, n, p, q), where **a** is an array containing **n** natural numbers $(2 \leq n \leq 10^9, 0 \leq a[i] \leq 10^9$ for $1 \leq i \leq n)$, and **p** and **q** are natural numbers $(1 \leq p \leq q \leq n)$.

```
Algorithm eCrescatoare(a, n, p, q):
    If p = q then
        Return True
    EndIf
    If p + 1 = q then
        Return a[p] < a[q]
    EndIf
    ...
EndAlgorithm
```

Which of the following instruction sequences can replace the ellipsis (the three dots) such that the algorithm will return *True*, if the sub-array $a[p]$, ..., $a[q]$ is in a strictly ascending order?

A. `Return eCrescatoare(a, n, p, (p + q) DIV 2) AND eCrescatoare(a, n, (p + q) DIV 2, q)`

B. `Return eCrescatoare(a, n, p, (p + q + 1) DIV 2) AND eCrescatoare(a, n, (p + q + 1) DIV 2, q)`

C.
```
If p + 2 = q then
    Return a[p] < a[p + 1] AND a[p + 1] < a[p + 2]
EndIf
Return eCrescatoare(a, n, p, ((p + q) DIV 2) + 1) AND eCrescatoare(a, n, ((p + q) DIV 2) + 1, q)
```

D.
```
If p + 2 = q then
    Return a[p] < a[p + 1] AND a[p + 1] < a[p + 2]
EndIf
Return eCrescatoare(a, n, p, (p + q) DIV 2) AND eCrescatoare(a, n, ((p + q) DIV 2) + 1, q)
```

12. Consider the algorithm altceva(n, k), where **n** and **k** are natural numbers ($1 \leq n \leq 10^4$, $0 \leq k \leq 10^4$):

```
Algorithm altceva(n, k):
    If n < k then
        Return False
    EndIf
    If n = k then
        Return True
    EndIf
    Return altceva(n - k, k + 2)
EndAlgorithm
```

Which of the following statements are true?

A. After the call altceva(256, 0) the algorithm returns *True*.
B. If the number **n** can be written as the product of two consecutive numbers and $k = 0$, then after the call altceva(n, k) the algorithm returns *True*.
C. If **n** is an odd number, then after the call altceva(n, 0) *False* is returned.
D. After the call altceva(272, 0) and after the call altceva(380, 0) the algorithm will return *True*.

13. Consider the following graph:
Which of the following depth-first and breadth-first traversals are correct, if the starting node is node 3?
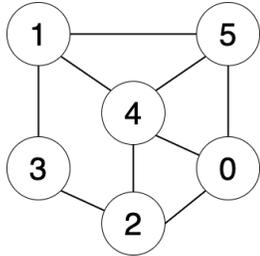
A.
Breadth-first: 3 2 4 1 0 5
Depth-first: 3 2 4 1 0 5
C.
Breadth-first: 3 2 1 4 0 5
Depth-first: 3 1 5 2 4 0

B.
Breadth-first: 3 1 4 2 5 0
Depth-first: 3 2 4 1 5 0
D.
Breadth-first: 3 1 2 4 5 0
Depth-first: 3 1 5 0 4 2

14. Consider the algorithm fill(mat, n, first, d), where **n** is a natural number ($1 \leq n \leq 200$), **mat** is a matrix with **n** rows and **n** columns (**mat**[1][1], **mat**[1][2], ..., **mat**[1][n], ..., **mat**[n][n]), and **first** and **d** are two natural numbers ($0 \leq first, d \leq 200$).

```
Algorithm fill(mat, n, first, d):
    current ← first
    For i ← 1, n execute
        If i MOD 2 = 0 then
            For j ← 1, n execute
                mat[i][j] ← current
                current ← current + d
            EndFor
        Else
            For j ← n, 1, -1 execute
                mat[i][j] ← current
                current ← current + d
            EndFor
        EndIf
    EndFor
    Return current
EndAlgorithm
```

Which of the following statements are true?

A. After the call fill(mat, 10, 1, 1), the sum of the elements from the last column of the matrix is 505.
B. After the call fill(mat, 10, 1, 1), the sum of the elements from the last row of the matrix is 955.
C. After the call fill(mat, n, first, d), the returned value is a multiple of the number **d**.
D. After the call fill(mat, 101, 0, 5), the element on the bottom right corner of the matrix is 51000.

15. Consider the algorithms Alg1(n, x) and Alg2(n, x), where **n** is a natural number ($3 \leq n \leq 10^4$), and **x** is an array containing **n** integer numbers ($x[1], x[2], ..., x[n]$, $-100 \leq x[i] \leq 100$, for $i = 1, 2, ..., n$).

```
Algorithm Alg1(n, x):
    For i ← 1, n - 1 execute // (+)
        For j ← 1, n - i execute
            If x[j] > x[j + 1] then // (*)
                aux ← x[j]
                x[j] ← x[j + 1]
                x[j + 1] ← aux
            EndIf
        EndFor
    EndFor
EndAlgorithm
```

```
Algorithm Alg2(n, x):
    For i ← 2, n execute // (+)
        key ← x[i]
        j ← i - 1
        While j ≥ 1 AND x[j] > key execute // (*)
            x[j + 1] ← x[j]
            j ← j - 1
        EndWhile
        x[j + 1] ← key
    EndFor
EndAlgorithm
```

Which of the following statements are true?

A. For any array x that is sorted in ascending order, the instruction marked with (*) from algorithm `Alg1(n, x)` will be executed more times that the instruction marked with (*) from algorithm `Alg2(n, x)`.
B. There is at least one array x of length 5 such that after 3 iterations of the loop marked with (+) from `Alg1(n, x)` array x will be [2, 1, 3, 7, 8], and after 3 iterations of the loop marked with (+) from `Alg2(n, x)`, array x will be [2, 3, 7, 8, 1].
C. In algorithm `Alg1(n, x)`, if at one iteration of the loop marked with (+) no swap is done, then the array is already sorted in ascending order and subsequent iterations of the loop will not modify the array.
D. Algorithm `Alg1(n, x)` has a time complexity of $O(n^2)$, and algorithm `Alg2(n, x)` has a time complexity of $O(n \log n)$.

16. Consider the algorithm `f(n, x)`, where n is a natural number ($1 \le n \le 10^3$), and x is an array containing n integer numbers ($x[1], x[2], ..., x[n], -10^3 \le x[i] \le 10^3$, for $i = 1, 2, ..., n$):

```
Algorithm f(n, x):
    i ← 2
    While i < n execute
        If x[i] = x[i - 1] + x[i + 1] then
            For j ← i, n - 1 execute
                x[j] ← x[j + 1]
            EndFor
            n ← n - 1
        Else
            i ← i + 1
        EndIf
    EndWhile
    Return n
EndAlgorithm
```

Which of the following statements are true?

A. After the calls `f(5, [2, 5, 3, 6, 1])` and `f(5, [2, 5, 3, 1, -1])` the algorithm returns the same value.
B. If array x is sorted in ascending order, and k is the index of the maximum value from the array, the value returned after the call `f(n, x)` is k.
C. For $n = 4$, there is an array x that contains distinct even values for which the value returned by the call `f(n, x)` is 2.
D. If x is an array that contains only odd numbers, and m is the result obtained after the call `f(n, x)`, then n is equal to m.

17. Consider the algorithm `verif(x, n, y, m)`, where n, m are natural numbers ($1 \le n, m \le 200$), x is an array containing n distinct integer numbers ($x[1], x[2], ..., x[n], -10^3 \le x[i] \le 10^3$, for $i = 1, 2, ..., n$), and y is an array containing m distinct integer numbers ($y[1], y[2], ..., y[m], -10^3 \le y[i] \le 10^3$, for $i = 1, 2, ..., m$).

```
Algorithm verif(x, n, y, m):
    ok ← True
    i ← 1
    While ok AND i ≤ n execute
        j ← 1
        While j ≤ m AND y[j] ≠ x[i] execute
            j ← j + 1
        EndWhile
        If j = m + 1 then
            ok ← False
        EndIf
        i ← i + 1
    EndWhile
    Return ok
EndAlgorithm
```

Which of the following statements are true?

A. If the length of array x is greater than the length of array y, then the algorithm returns *False.*
B. If after the call `verif(x, n, y, m)` the algorithm returns *True*, the product of all the elements in array x has the same last digit as the product of all the elements of array y.
C. After the calls `verif([1, 2, 3, 4], 4, [1, 7, 2, 5, 3, 4, 10], 7)` and `verif([4, 2, 1, 3], 4, [1, 10, 2, 5, 3, 4, 7], 7)` the algorithm returns the same result.
D. If array x contains all the even numbers from the interval [-20, 100], sorted in ascending order, and array y contains all the multiples of 4 from the interval [-20, 100], sorted in descending order, then after the call `verif(x, n, y, m)` the algorithm returns *True.*

18. Consider the algorithm enigma(x, n), where n is a natural number ($1 \le n \le 100$), and x is an array containing n natural numbers ($x[1]$, $x[2]$, ..., $x[n]$, $10 \le x[i] \le 10^5$, for $i = 1, 2, ..., n$).

```
Algorithm enigma(x, n):
    If n = 0 then
        Return 0
    EndIf
    a ← x[n]
    s ← 0
    While a > 0 execute
        s ← s + (a MOD 10)
        a ← a DIV 10
    EndWhile
    p ← enigma(x, n - 1)
    If s > p then
        Write '*'
        Return s
    EndIf
    Return p
EndAlgorithm
```

Which of the following statements are true?

A. If after the call enigma(x, n) there are n '*' characters displayed, then array x is sorted in ascending order.

B. After the call enigma([19, 28, 37, 46], 4), the algorithm returns 10.

C. If array x is sorted in ascending order, then after the call enigma(x, n) n '*' characters will be displayed.

D. After the call enigma([99, 95, 91, 11], 4), the algorithm will not display any '*' character.

19. Consider the algorithm modifica(X, n), where n is a natural number ($1 \le n \le 100$), and X is an array containing n natural numbers ($X[1]$, $X[2]$, ..., $X[n]$, $10 \le X[i] \le 10^5$, for $i = 1, 2, ..., n$):

```
Algorithm modifica(X, n):
    For i ← 1, n execute
        For j ← 1, n - i execute
            a ← X[j]
            While a ≥ 100 execute
                a ← a DIV 10
            EndWhile
            a ← a MOD 10
            b ← X[j + 1]
            While b ≥ 100 execute
                b ← b DIV 10
            EndWhile
            b ← b MOD 10
            If a > b then
                X[j] ← X[j] + X[j + 1]
                X[j + 1] ← X[j] - X[j + 1]
                X[j] ← X[j] - X[j + 1]
            EndIf
        EndFor
    EndFor
    Return X
EndAlgorithm
```

Which of the following statements are true?

A. After the call modifica([51, 24, 65, 756, 38, 82, 13, 22], 8) the algorithm returns the array [51, 82, 22, 13, 24, 65, 756, 38].

B. After the call modifica([1845, 9076, 3545, 242, 13, 512, 61, 86], 8) the algorithm returns the array [9076, 512, 61, 13, 242, 3545, 86, 1845].

C. After the call modifica([372, 4932, 42, 5201, 8193, 4672, 195, 88, 57], 9) the algorithm returns the array [42, 57, 88, 195, 372, 4932, 4672, 5201, 8193].

D. After the call modifica([87, 19, 28, 656, 943, 2061, 1121], 7) the algorithm returns the array [2061, 1121, 943, 656, 87, 28, 19].

20. Consider the algorithm ceface(k, n, x), where n and k are natural numbers ($1 \le k \le n \le 10^3$), and x is an array containing n natural numbers ($0 \le x[1]$, $x[2]$, ..., $x[n] \le 10^3$).

```
Algorithm ceface(k, n, x):
    For a ← 1, n execute
        x[k] ← a
        If n - x[k] > 0 then
            ceface(k + 1, n - x[k], x)
        Else
            print(k, x)
        EndIf
    EndFor
EndAlgorithm
```

```
Algorithm print(k, x):
    For i ← 1, k execute
        Write x[i], " "
    EndFor
    Write new line
EndAlgorithm
```

Which of the following statements are true?

A. After the call `ceface(1, 5, x)`, only equal values will be displayed on the first line.
B. After the call `ceface(1, 5, x)`, the values 2 and 3 will be displayed on the fifth line.
C. The algorithm displays all the subsets with k elements of the set $\{1, 2, ..., n\}$.
D. After the call `ceface(1, n, x)`, 2^{n-1} lines will be displayed.

21. Consider the algorithm `calcul(n)`, where n is a natural number ($2 < n < 10$). The algorithm `zerosMatrice(n)` returns a square matrix with n rows and n columns, and with all elements equal to 0. The algorithm `zerosVector(n)` returns an array with n elements, all equal to 0.

```
Algorithm calcul(n):
    a ← zerosMatrice(n)
    v ← zerosVector(n - 1)
    a[1][2] ← 0
    a[2][2] ← 1
    v[1] ← 1
    For i ← 2, n - 1 execute
        v[i] ← 0
        For j ← 1, i - 1 execute
            a[i + 1][j + 1] ← a[i][j] + a[i][j + 1]
            v[i] ← v[i] * 10 + a[i + 1][j + 1]
        EndFor
        a[i + 1][i + 1] ← 1
        v[i] ← v[i] * 10 + a[i + 1][i + 1]
    EndFor
    Return v
EndAlgorithm
```

What values will the returned array contain after the call `calcul(n)`?

A. The number 11 raised at each of the powers from 0 to $n - 2$.
B. The first n multiples of 11.
C. Elements from the sequence $2 * x[i] - 1$ ($i > 0$), where sequence x is defined as such: $x[1] = 1$, $x[2] = 6$, $x[k] = x[k - 1] * 10 + 1$ (for $k > 2$)
D. Elements from the sequence x, where sequence x is defined as such: $x[1] = 1$, $x[k] = x[k - 1] * 11$ (for $k > 1$)

22. Consider the algorithm `genereaza(n, a, k, p)`, where n, k and p are natural numbers ($1 \le n \le 12$, $0 \le p \le n$, $1 \le k \le 10^6$), and a is an array containing n natural numbers ($a[1], a[2], ..., a[n], 0 \le a[i] \le 10^4$, for $i = 1, 2, ..., n$).

```
Algorithm genereaza(n, a, k, p):
    If p = n then
        Return k - 1
    EndIf
    r ← k
    For i ← 1, n execute
        If r > 0 AND NOT contine(a, p, i) then
            a[p + 1] ← i
            r ← genereaza(n, a, r, p + 1)
        EndIf
    EndFor
    Return r
EndAlgorithm
```

```
Algorithm contine(a, n, v):
    For i ← 1, n execute
        If a[i] = v then
            Return True
        EndIf
    EndFor
    Return False
EndAlgorithm
```

What will be the value of array a after the call `genereaza(6, [0, 0, 0, 0, 0, 0], 482, 0)`?

A. `[4, 1, 2, 3, 6, 5]`
B. `[1, 1, 3, 2, 3, 2]`
C. `[5, 1, 2, 3, 6, 4]`
D. `[5, 1, 2, 4, 6, 3]`

23. Consider the algorithm f(n, a), where *n* is a natural number ($2 \le n \le 10^6$), and *a* is an array ($a[1], a[2], ..., a[n], 1 \le a[i] \le 10^6$ for $i = 1, 2, ..., n$) containing *n* natural numbers. The algorithm zerosMat(n) returns a matrix with *n* rows and *n* columns, having all elements equal to 0.

```
Algorithm f(n, a):
    m ← zerosMat(n)
    i ← 1
    j ← n
    While i ≤ n AND j ≥ 1 execute
        If a[i] < a[j] then
            m[i][j] ← 1
            i ← i + 1
        Else
            m[i][j] ← 2
            j ← j - 1
        EndIf
    EndWhile
    Return m
EndAlgorithm
```

Which of the following statements are true?

A. If array *a* is sorted in ascending order, then after the f(n, a) call the value 2 appears in the matrix *n* times.

B. If array *a* is sorted in descending order, then after the f(n, a) call the value 2 appears in the matrix once.

C. If the elements of array *a* are all equal, then after the f(n, a) call each row of the matrix will contain at least one non-zero value.

D. After the f(5, [1, 1, 4, 6, 9]) call, the last row of the matrix will contain only values equal to 2.

24. Consider beads of three colors (which we will denote by the strings "0", "1" and "2") and the algorithm colier(n), where *n* is a natural number ($4 \le n \le 3 * 2^{10}$). We want to create a necklace of beads of length *n* that does not contain two identical consecutive sub-arrays. For example, for *n* = 4, we cannot have "0211" (because the sub-array "1" would occur twice consecutively). Similarly, we cannot have "0202" (here, sub-array "02" occurs twice consecutively). One of the possible solutions is "0201". The + operator represents string concatenation, and the len(s) algorithm returns the length of string *s*.

```
Algorithm extinde(cuv):
    res ← ""
    i ← 1
    While i ≤ len(cuv) execute
        c ← cuv[i]
        If c = "0" then
            res ← res + "012"
        Else
            If c = "1" then
                res ← res + "02"
            Else
                res ← res + "1"
            EndIf
        EndIf
        i ← i + 1
    EndWhile
    Return res
EndAlgorithm
```

```
Algorithm colier(n):
    cuv ← "0"
    While len(cuv) < n execute
        cuv ← extinde(cuv)
    EndWhile
    res ← ""
    i ← 1
    While i ≤ n execute
        res ← res + cuv[i]
        i ← i + 1
    EndWhile
    Return res
EndAlgorithm
```

Which of the following statements are true?

A. The algorithm colier(n) returns the representation of a necklace according to the requirements, regardless of the value of *n*.

B. After the call colier(8), the returned value will be "01202101".

C. For the calls colier(10) and colier(12), the algorithm extinde(cuv) will be called the same number of times.

D. The algorithm colier(n) returns the representation of a necklace according to the requirements, if and only if *n* can be written using the formula $3 * 2^k$ ($1 \le k \le 10$).

BABEŞ-BOLYAI UNIVERSITY

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Mate-Info Contest – March 21, 2026

Written Exam for Computer Science

GRADING AND SOLUTIONS

DEFAULT: 10 points

1	BD	3.75 points
2	CD	3.75 points
3	AD	3.75 points
4	AD	3.75 points
5	B	3.75 points
6	AD	3.75 points
7	C	3.75 points
8	D	3.75 points
9	BCD	3.75 points
10	BCD	3.75 points
11	ABC	3.75 points
12	BCD	3.75 points
13	D	3.75 points
14	AB	3.75 points
15	ABC	3.75 points
16	CD	3.75 points
17	AC	3.75 points
18	B	3.75 points
19	ABD	3.75 points
20	AD	3.75 points
21	AD	3.75 points
22	C	3.75 points
23	AD	3.75 points
24	ABC	3.75 points