WP3 PYTHAGORAS

An improvement way for knowledge transfer

INTERNATIONAL CONFERENCE ON APPROXIMATION THEORY and Its Applications

Nicolae Constantinescu, Augusta Raţiu,
Florin Sofonea, Oana Ţicleanu

How we evolve together with them

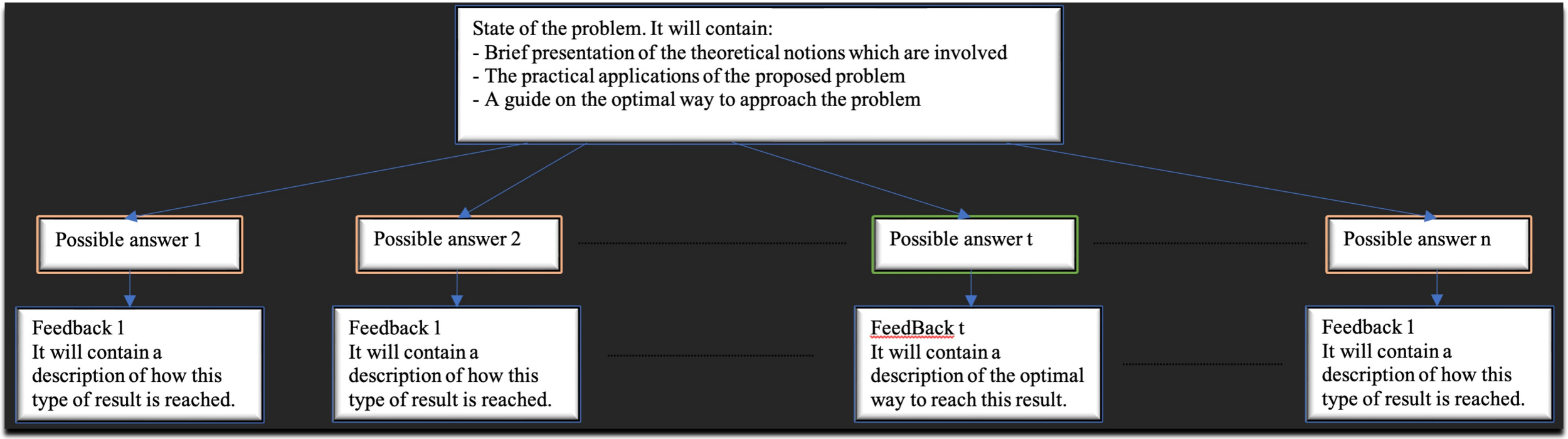
- The project started by putting together the experience accumulated by several collectives of university teaching staff, regarding modern learning techniques.
- The next step was the analysis of the problems encountered by students in the accumulation of knowledge
- The third step was to understand how automatic techniques can be combined with those in which the direct teacher-student relationship is used
- The fourth step represented the choice of the platform in which to implement the structure designed through the collaboration of the teachers' collectives
- The fifth step consists of continuous meetings, in which problems, implementation solutions and adaptation methods are presented according to the particularities of the chosen platform

How we implemented a DataRoom to create the physical and software platform

- A space has been created for the installation of the DataRoom
- Electrical and internet connections with backup were ensured
- A specialized application server was purchased
- A domain was purchased for the current and future applications
- A server virtualization system has been configured
- The specialized STACK environment has been installed
- The suites of specialized packages for advanced e-learning services have been installed
- System user hierarchies have been created
- System maintenance and updates are continuously ensured

How we work on DataRoom side

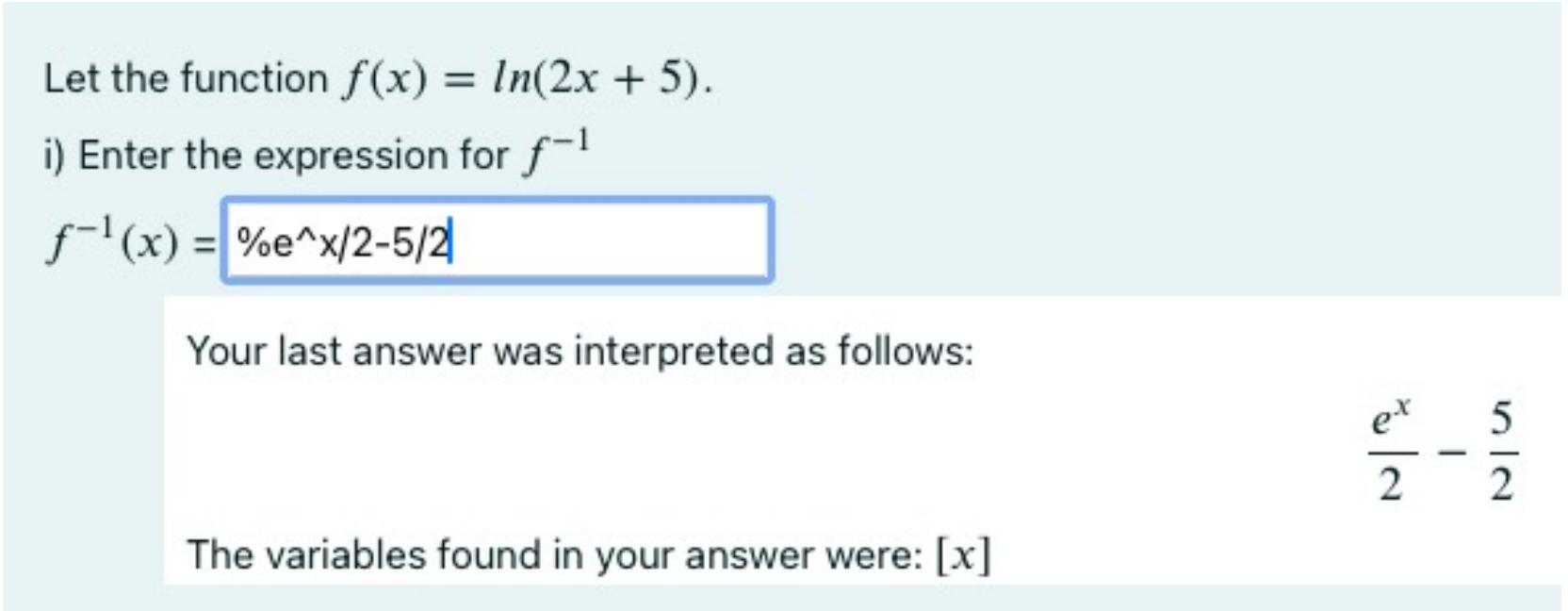
- OS configuration for application server.
- Configuration of virtualization system for the server.
- Virtual servers configuration.
- The virtual machine for the moodle environment setup and tunning.
- Packages configuration for the implemented services (including stack/moodle environment).
- Maintenance of virtual machines, physical server, website.
- The study on the implementation models of queries with formative feedback in the stack environment. Maintenance of virtual machines, physical server, website.


State of the problem. It will contain:
- Brief presentation of the theoretical notions which are involved
- The practical applications of the proposed problem
- A guide on the optimal way to approach the problem
Possible answer 1
Possible answer 2
Possible answer t
Possible answer n
Feedback 1
It will contain a description of how this type of result is reached.
Feedback 1
It will contain a description of how this type of result is reached.
FeedBack t
It will contain a description of the optimal way to reach this result.
Feedback 1
It will contain a description of how this type of result is reached.

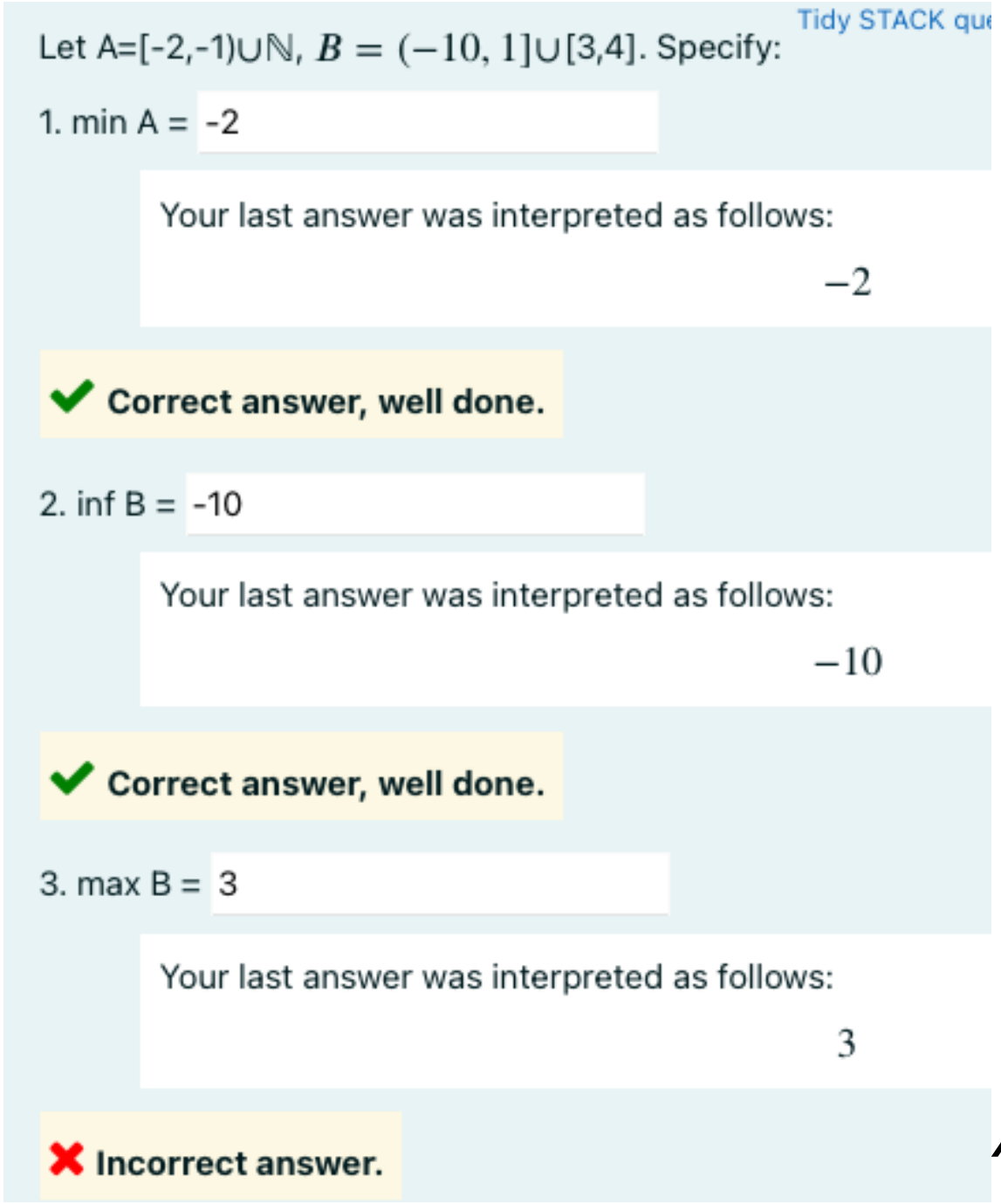
Moodle STACK is a sophisticated assessment system designed for mathematics, scientific, and related disciplines, integrated into the Moodle online learning platform. This complex solution provides an interactive and flexible environment for testing and evaluating students' knowledge in mathematics and sciences, enabling responses that involve mathematical expressions, thereby replacing multiple-choice questions with the ability to input mathematical solutions directly.

To better understand Moodle STACK, it is important to first analyse its essential features and how they contribute to improving the learning and evaluation process in the online environment.

One of the defining characteristics of Moodle STACK is its ability to allow students to input mathematical answers directly within the Moodle platform. This is crucial for accurately assessing knowledge and skills in mathematics and sciences, as some questions require explanations and complex solutions that cannot be reduced to simple multiple-choice selections.



Another important feature of Moodle STACK is the ability to create questions with multiple parts, each part being evaluated separately. This allows for a more detailed assessment of students' competencies and provides a more comprehensive picture of their understanding of the subject.



Additionally, Moodle STACK offers advanced options for generating random components within questions. This is useful for creating a variety of practical questions and for preventing collaboration among students during tests. Randomly generated components ensure that each student receives a unique set of questions, thereby reducing the possibility of copying or cheating.

The coefficients of the equation are randomly generated in an interval set by the teacher for each individual student, or at each viewing of the question.

Compute the solutions for the equation:

$2 \cdot x^2 + 6 \cdot x - 4 = 0$

[x = -((sqrt(17)+3)/2),x =(sqrt(17)-3)/2]

Your last answer was interpreted as follows:

$$\left[x = -\frac{\sqrt{17}+3}{2}, x = \frac{\sqrt{17}-3}{2}\right]$$

The variables found in your answer were: $[x]$

Question variables

```
z: apply("+", [ ev(rand_with_prohib(-5, 5, [0])*x^2), ev(rand_with_prohib(-5, 10, [0])*x),
ev(rand_with_prohib(-5, 5, [0]))]);

roots: solve(z = 0, x);
```

Another essential aspect of Moodle STACK is the ability to provide personalized and detailed feedback to students. Feedback can be tailored to each student's results and can be used to highlight both their strengths and weaknesses. This approach encourages active student engagement in the learning process and helps them better understand the concepts and issues they are facing.

For example, we have the following equation:

Let $(s_n) = \left\{ \frac{P_k(n)}{Q_i(n)}, n \in \mathbb{N} \right\}$ a sequnce such that $P_k(n)$ and $Q_i(n)$ are two polinomial of degree $k \leq 3$ respectuvely.

Give an example of sequence s_n such that sequence is

a) divergent;

b) convergent to zero;

c) convergent to $\frac{3}{5}$;

Let

$(s_n) = \left\{ \frac{P_k(n)}{Q_i(n)}, n \in \mathbb{N} \right\}$ a sequence such that $P_k(n)$ and $Q_i(n)$ are two polinomyal of degrees $k \leq 3$ respectively.

Give an example of a sequence s_n such that sequence is

a) divergent; {-(2*n^3)+5*n+1}/{n^2-4}

Your last answer was interpreted as follows:

$$\frac{\{-2 \cdot n^3 + 5 \cdot n + 1\}}{\{n^2 - 4\}}$$

The variables found in your answer were: $[n]$

✔ **Correct answer, well done.**

b) convergent to zero; {-(2*n^2)+5*n+1}/{n^3-27}

Your last answer was interpreted as follows:

$$\frac{\{-2 \cdot n^2 + 5 \cdot n + 1\}}{\{n^3 - 27\}}$$

The variables found in your answer were: $[n]$

✔ **Correct answer, well done.**

c) convergent to $\frac{3}{5}$. {6*n^3+1}/{10*n^3-1}

Your last answer was interpreted as follows:

$$\frac{\{6 \cdot n^3 + 1\}}{\{10 \cdot n^3 - 1\}}$$

The variables found in your answer were: $[n]$

✖ **Incorrect answer.**

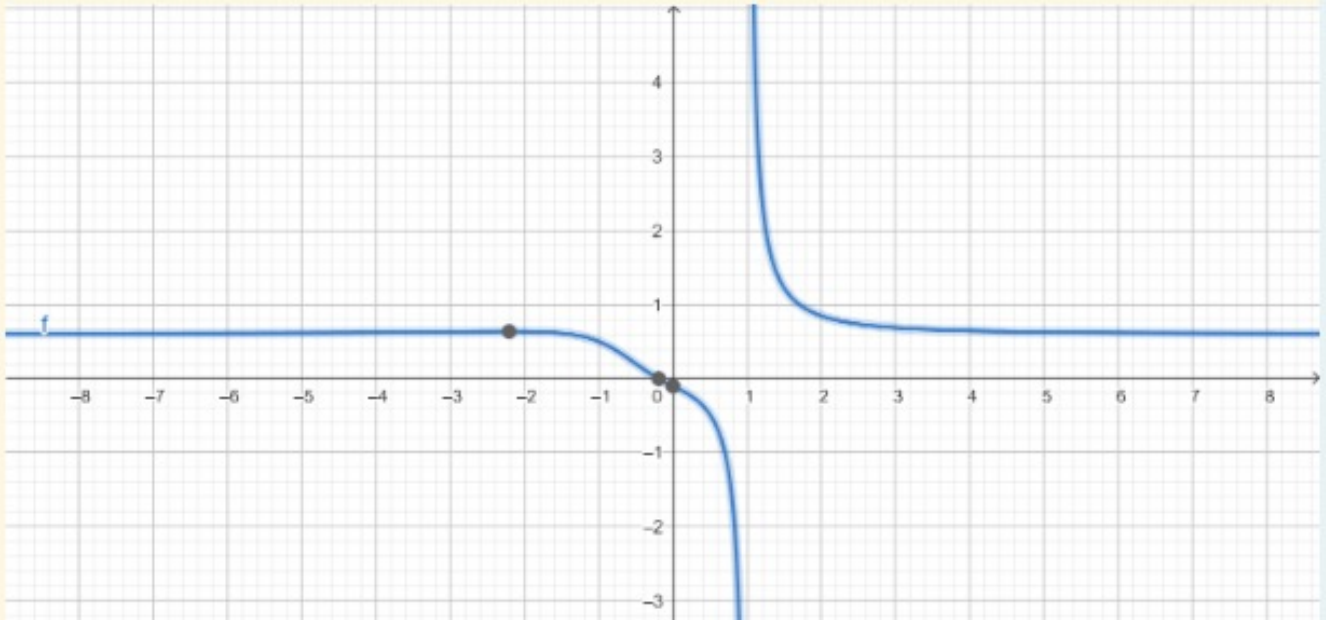
Consider the sequence $(s_n), s_n = \frac{a_k n^k + a_{k-1} n^{k-1} + \ldots + a_1 n + a_0}{b_i n^i + b_{i-1} n^{i-1} + \ldots + b_i n + b_0}$.

(s_n) is convergent to $\frac{3}{5}$ if $k = i$ and $\frac{a_k}{b_i} = \frac{3}{5}$

For example:

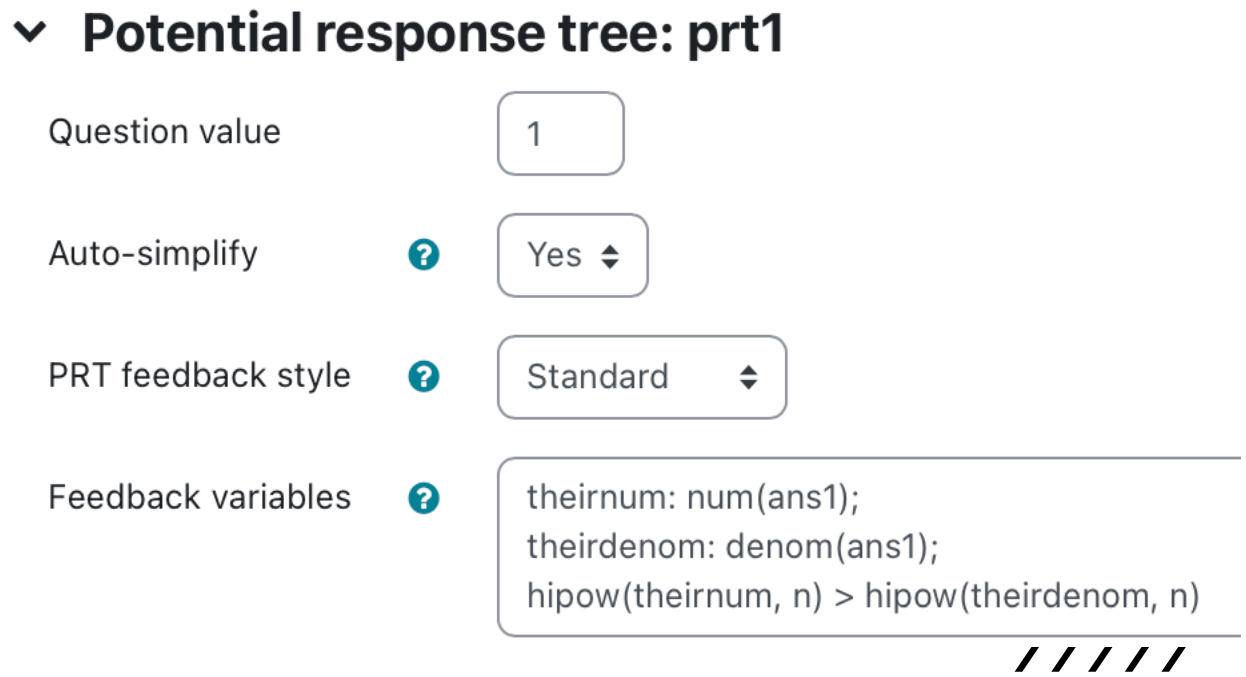
$(s_n), s_n = \frac{6n^3+5n+1}{10n^3-1}, n \in \mathbb{N}$ is convergent to $\frac{3}{5}, \lim_{n \to \infty} s_n = \frac{3}{5}$

Using GeoGebra, we can consider the function $f(x) = \frac{6x^3+5x+1}{1-x^3=10}, x \in \mathbb{R} \backslash \{1\}$



In some equations or algebra problems, such as the previous example, to analyse the student's answer (ans1) in the context of an equation with many possible answers, it is important to check the relationship between the numerator and the denominator, especially in terms of powers the variables involved. For example, in differential equations or certain optimization problems, the form of the answer may require the numerator to be a higher power of a variable compared to the denominator.

The code in the image extracts the numerator and denominator of the student answer and compares the maximum power of a variable n between them. This ensures that the answer obeys some relationship between the numerator and the denominator, relevant to the correct form of solutions to the equation with many answers.



Node 1

Answer test: Num-GT | SAns: hipow(theirnum, n) | TAns: hipow(theirdenom, n | Test options: | Quiet: No

Node 1 when true

Mod: = | Score: 1 | Penalty: | Next: [stop]

Answer note: prt1-1-T

Node 1 true feedback

Let's analyze if the sequence \(s_n=\frac{-2n^3+5n+1}{n^2-4}\) is divergent. Let's look at the behaviour of this sequence as \(n\rightarrow \infty\).

Consider the polynomials:

Node 1 when false

Mod: = | Score: 0 | Penalty: | Next: [stop]

Answer note: prt1-1-F

Node 1 false feedback

{@theirnum@}

Consider the sequence \((s_n),s_n=\frac{a_kn^k+a_{k-1}n^{k-1}+\ldots+a_1n+a_0}{b_in^i+b_{i-1}n^{i-1}+\ldots+b_in+b_0}\).

\((s_n)\) is divergent if \(k>i\)

For example:
\((s_n),s_n=\frac{-2n^3+5n+1}{n^2-4}, n\in\mathbb{N}\) is divergent. \

- In addition to these core features, Moodle STACK also offers a wide range of additional tools and resources to enhance the learning and evaluation experience. These may include interactive tutorials, sample questions and solutions, practical exercises, and much more, all tailored to the specific needs of each course or discipline.

  - For example, STACK offers the possibility to introduce at the beginning of the evaluation a theoretical part that will give the student a short recapitulation that will help in obtaining a maximum score.

Information

Definition: A sequence of real numbers is a function $f:\mathbb{N}\to\mathbb{R}$, $f(n)=a_n$ or $f:\mathbb{N}\setminus A\to\mathbb{R}$, where $A\subset\mathbb{N}$ finite, $f(n)=a_n$.

Notation: (a_n) is the sequence defined by the function f.

Definition: A sequence of real numbers (a_n) is increasing (decreasing) if $a_n\leq a_{n+1}$ $(a_n\geq a_{n+1})$, $\forall n\geq 0$. If the above inequalities are strictly, then the sequence is called strictly increasing (strictly decreasing).

To study the monotony of a sequence (a_n), the sign of the difference $\Delta a_n = a_{n+1}-a_n$ can be establish or to compare the ratio $\frac{a_{n+1}}{a_n}$ with 1, when $a_n>0, \forall n\geq 0$.

Types of equations in STACK:

- ✓ *Multiple choice* – allows the selection of a singular o multiple responses from a pre-defined list
- ✓ *True/False* – a simple form of multiple choice question with just the two choices “True” and ”Fals”
- ✓ *Matching* – the answer to each of a number of subquestion must be selected from a list of possibilities
- ✓ *Essay* – allows a response of a file upload and/or online text. This must then be graded manually
- ✓ *Drag and drop into text* – STACK provides mathematical questions for the Moodle quiz. These use a computer algebra system to establish the mathematical properties of the student's responses.
- ✓ *Select missing words* – missing words in the question text are filled in using drop-down menus
- ✓ *STACK* - STACK provides mathematical questions for the Moodle quiz. These use a computer algebra system to establish the mathematical properties of the student's responses.

This type of question allows students to choose as an answer one or more of the items and has the possibility to **access GeoGebra** to calculate the correct answer.

For this type of question, for each student the items can be generated randomly, so that the items a, b, c, d are always in a different order.

In this example, the correct answer consists of two subpoints, so if the student has selected only one correct answer, they will receive half of the question's score.

Give an example of a sequence:

$(s_n)=\frac{an+b}{cn+d}, n \in \mathbb{N}$, where $a, b, c, d \in \mathbb{R}$ such that the sequence is:

a) increasing and convergent to 3;

b) decreasing and convergent to 3.

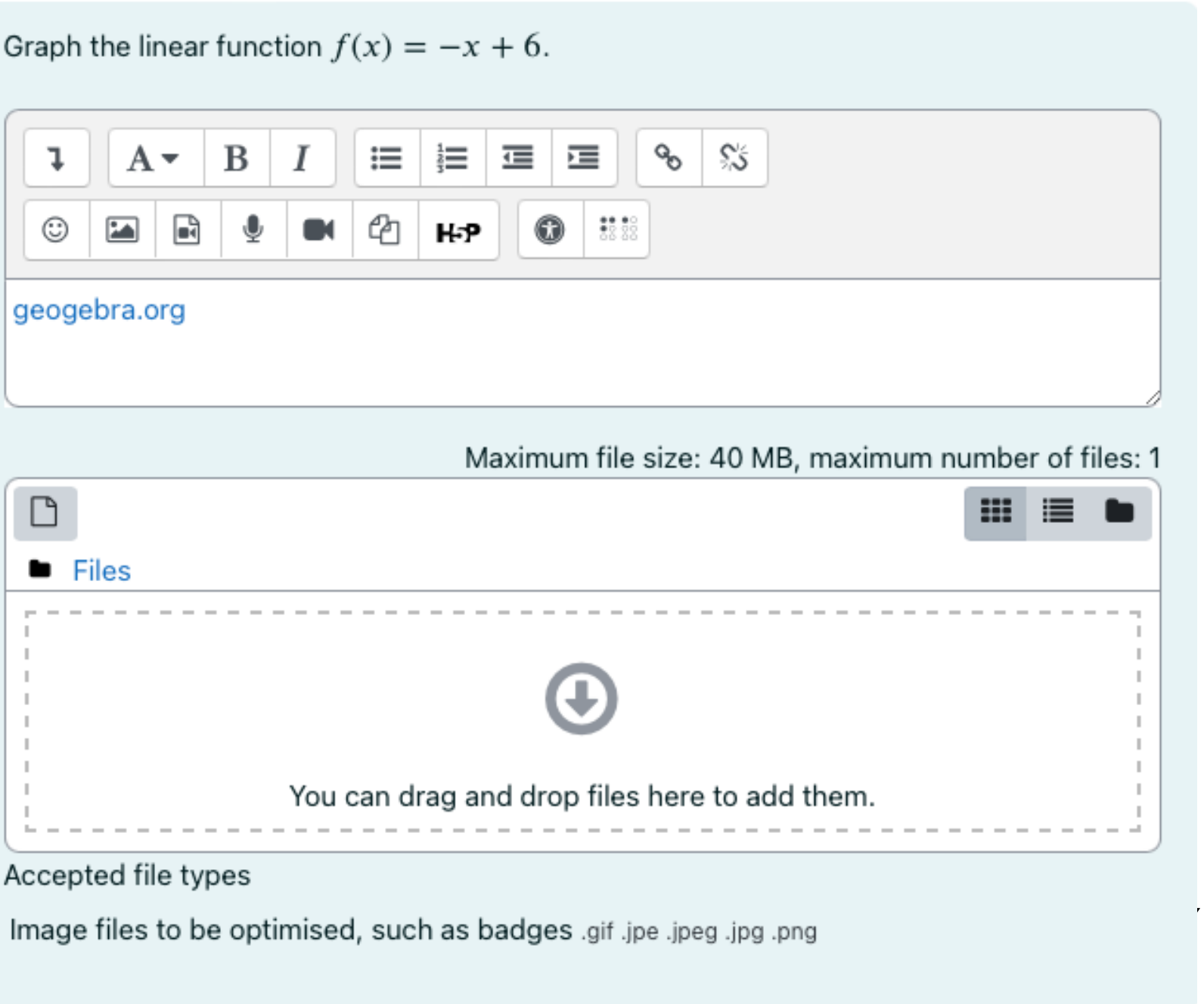
Use GeoGebra to check your sequences before you answer.

https://www.geogebra.org/calculator

Select the correct answer:

- a. sequence (s_n) is decreasing to 3 if $a = 3c, ad \leq bc$
- b. sequence (s_n) is increasing to 3 if $a = 3c, ad \geq bc, \frac{d}{c} \geq 0$ ✔
- c. sequence (s_n) is decreasing to 3 if $a = 3c, ad \leq bc, \frac{d}{c} \geq 0$
- d. sequence (s_n) is increasing to 3 if $a = 3c, ad \geq bc$ ✖

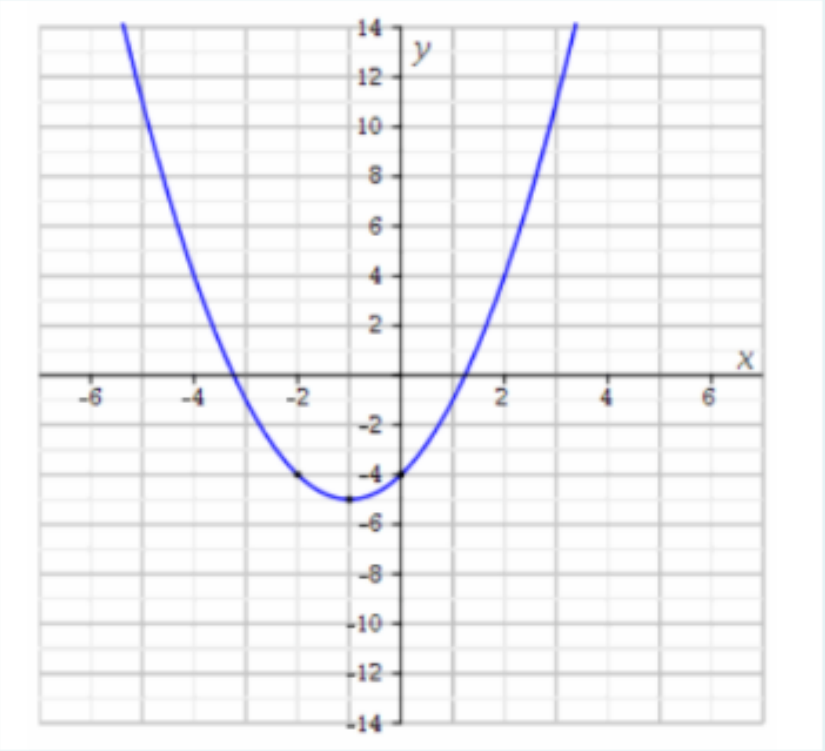
This type of question is designed to allow students to access GeoGebra for creating the graph related to the question, after which it allows them to upload the file containing the graph generated in GeoGebra.



Another type of question: within the statement, you can also insert the graph related to the problem, and the students input equations directly into Moodle, and can see a preview before they submit.

Let $f(x) = k(x + a)^2 + b$ be a quadratic function.
Investigate, how the graph of the function depends on the values of the parameters a, b and k.

d) The figure below shows the graph $y = f(x)$ of a quadratic function f. Use the method that you described in prompt c) to determine f. Use the method that you described in prompt c) to determine f.



$f(x)$ = 2*x^2+4*x-1

Your last answer was interpreted as follows:

$$2 \cdot x^2 + 4 \cdot x - 1$$

The variables found in your answer were: $[x]$

For the previous question, the student has the possibility to enter the correct answer in two forms:

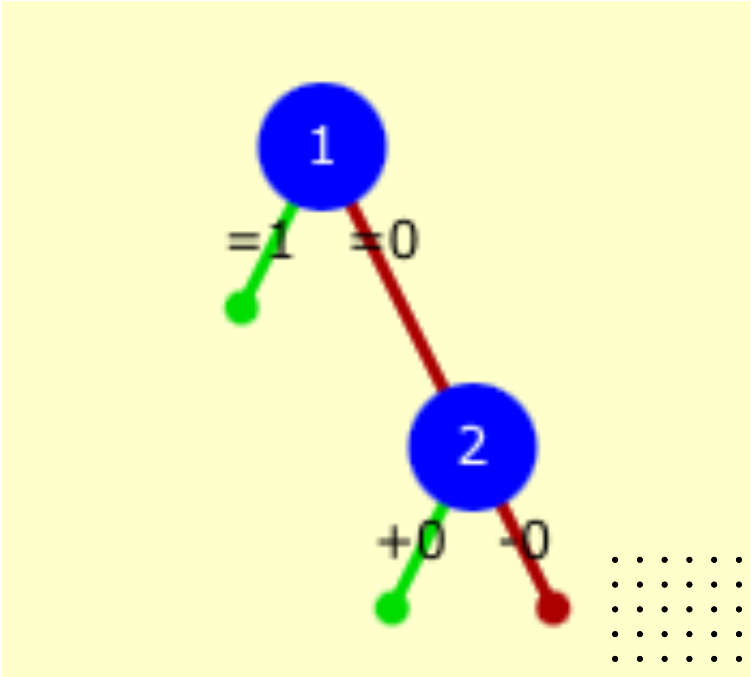
- 2*x^2+4*x-1 equivalent to: $2x^2 + 4x - 1$

⇕

- 2*(x+1)^2-3 equivalent to: $2(x + 1)^2 - 3$

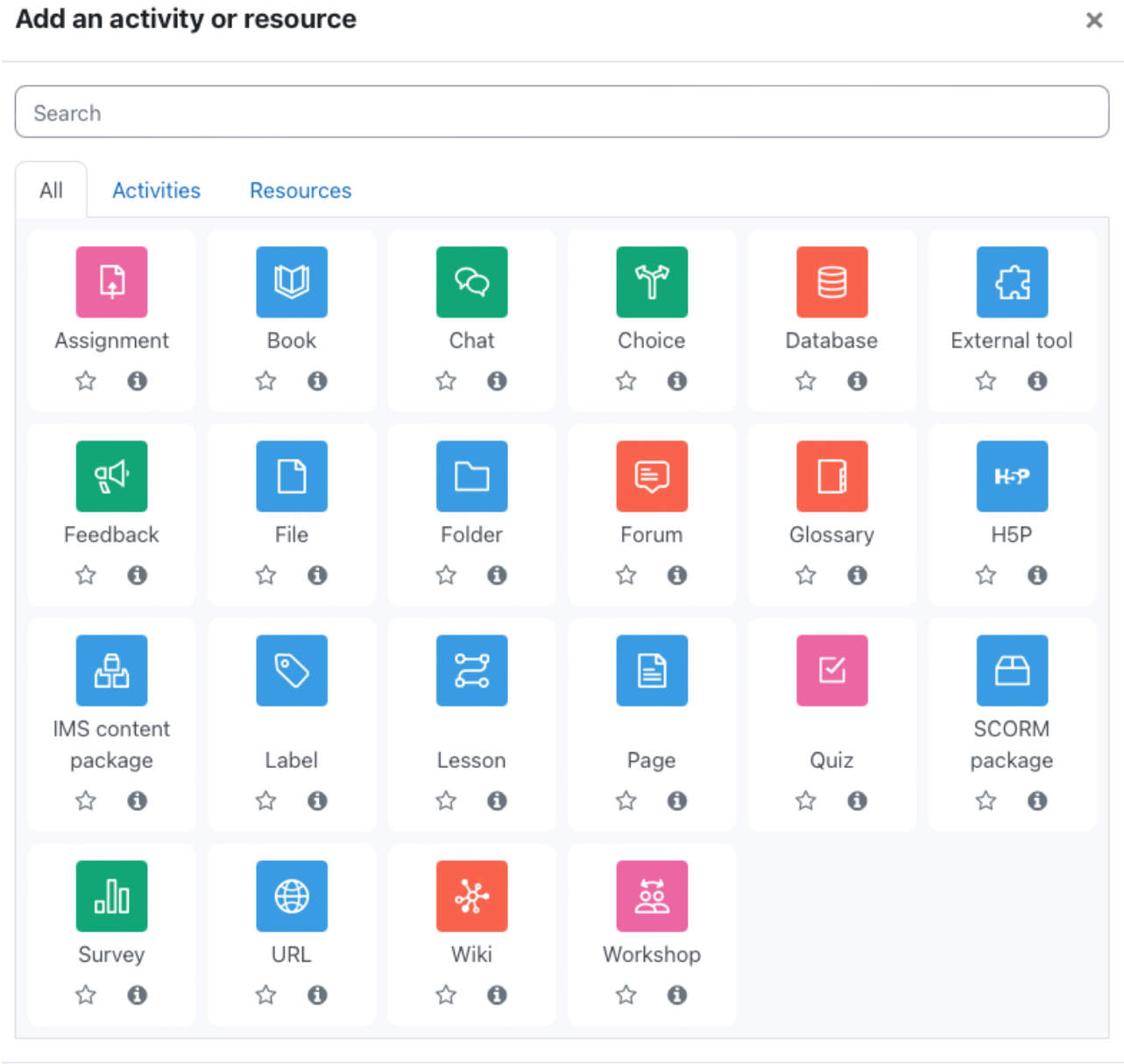
For this introduction, the question must be implemented in such a way as to allow writing the two correct forms. Therefore, when designing the questions, the teacher must think of all the writing methods of the correct answer.

If for a question there are several writings related to the correct answer, it is necessary to create a tree related to the potential correct answers.



Create, configure the test and assigning it to students

Identify the section where you want to enter the test (for example, the current week) and add a new activity (Add an activity or resource) of the grid test type (Quiz)



Stack implementation in other areas – **Computer Science**

The applicability of evaluation systems with integrated learning with feedback shows its benefits, for example, a module that helps students prepare for a license exam. Within it, the test has integrated formative feedback that helps the student to deepen the subject, in cases where the answers are correct, giving details on alternative methods, and in case some notions are not known, to explain in a personalized way what exactly it has to learn, why he had inadvertences in his answers and what connections he needs to make in order to understand the scientific links between the component parts of the subject matter to be studied.

All this transcribes the difficulty of the learning process for content creators for such tests, whose experience is fundamental in creating such quality content.

Question text

What values will the following program display?

```
int x = 9, y = 5, a, b, c;
b = a = x++;
y++;
c = x + y;
b = (++y) + a;
printf("\n%d %d %d", a, ++b, c);
```

a = [[input:ans1]] [[validation:ans1]][[feedback:prt1]]

b = [[input:ans2]] [[validation:ans2]][[feedback:prt2]]

c = [[input:ans3]] [[validation:ans3]][[feedback:prt3]]

Tidy STACK question

What values will the following program display?

```
int x = 9, y = 5, a, b, c;
b = a = x++;
y++;
c = x + y;
b = (++y) + a;
printf("\n%d %d %d", a, ++b, c);
```

a =

b =

c =

Check

Formative Feedback for previous Stack Questions

Standard feedback for correct

✔ Correct answer, well done.
You have carefully analyzed each step of the code and correctly calculated the values of the variables a, b, and c. It is essential to understand how the assignment and increment operators work in the context of complex expressions and to pay attention to the order in which these operations are performed.

An important point that you illustrated with this problem is how the increment (++) and assignment (=) operators can influence the values of variables and the final output of the program.

Standard feedback for partially correct

Your answer is partially correct.

Standard feedback for incorrect

✖ Incorrect answer.
int x = 9, y = 5, a, b, c;

b = a = x++;

y++;

c = x + y;

b = (++y) + a;

printf("\n%d %d %d", a, ++b, c);

In this program, we will analyze the values that the variables a, b, and c will display at the end of execution, taking into account the initial values and the operations performed on them within the code.

Initialization and assignment of values:

int x = 9, y = 5, a, b, c;: We declare the variables x, y, a, b and c, and initialize the variables x and y with the values 9, 5.

b = a = x++;: We assign the values of x to the variables a and b, and then increment x. So a gets the initial value of x, which is 9, and b gets the value of a.

Incrementing y and calculating c:

y++;: We increment y by 1, so y will become 6.

c = x + y;: We calculate the sum of x and y, which are now x=10 and 6, and store it in c. So c will be 16.

Modification of b:

b = (++y) + a;: We increment y by 1 (so y becomes 7) and add the value of a to y. Since a is 9, adding 9 to 7 gives 16.

Display the result:

Finally, we display the values of a, ++b and c, but before displaying the value of b we will increment it by 1, making it 17.

Determination of values:

a: Gets the value of x from the first assignment, so it will be 9.

b: Calculated in the previous step as 17.

c: It was previously calculated as 16.

Percentaged multiple type choice tests

Specify the displayed values, if the numerical values 5 2 -3 are to be read in the indicated order:

```
int main() {
    int a, b;
    scanf("%d%d%d", &a, &b, &a);
    printf("%d,", a);
    printf("%d,", b);
    printf("%d", a + b);
}
```

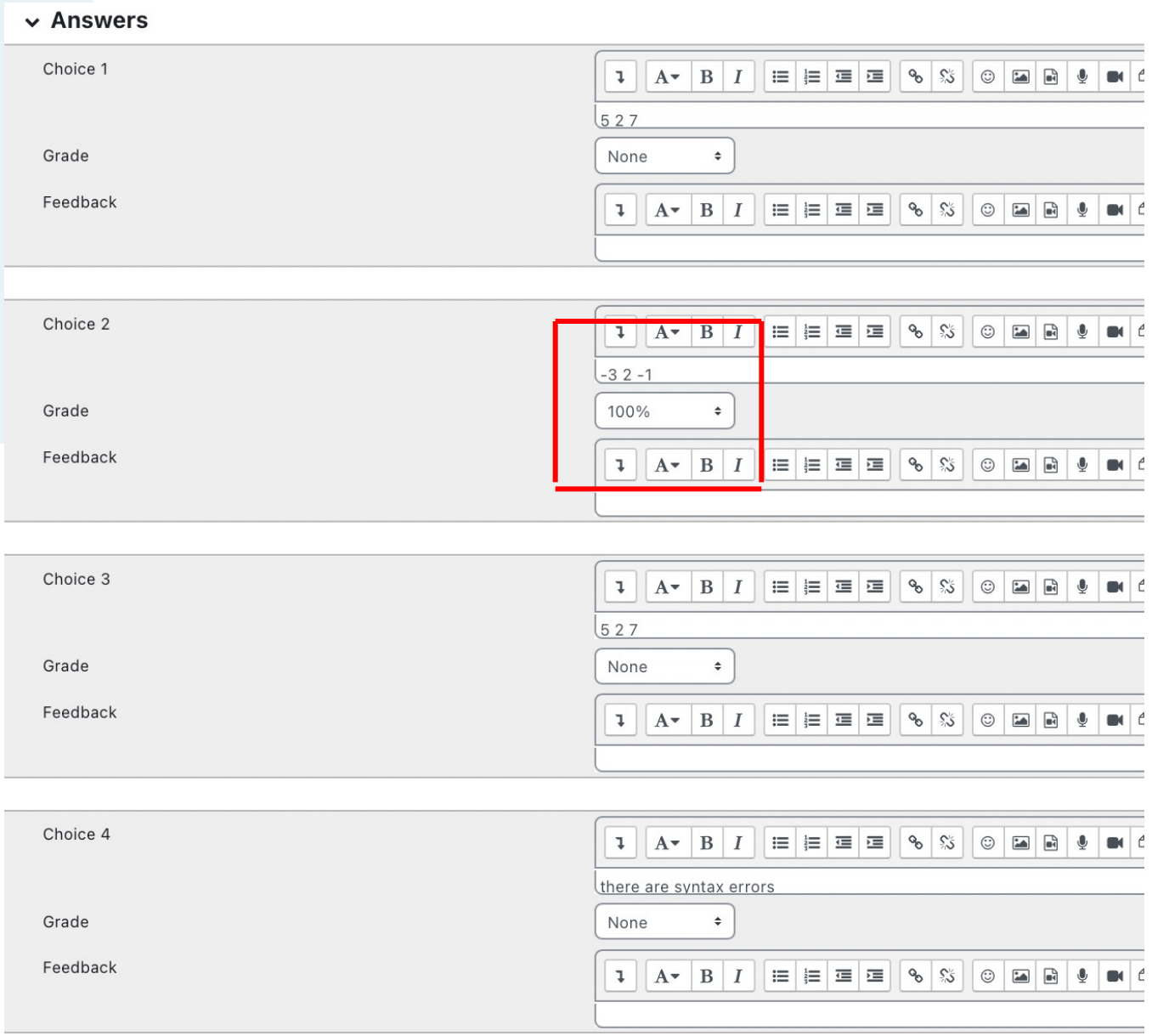
a. there are syntax errors

b. 5 2 7

c. -3 2 -1

d. 5 2 7

For this example, there is only one correct answer, but, if we have more than one answer the grade of the answer will be divided in number of choice.



Combined Feedback for previous Multiple Choice Tests

Combined feedback

For any correct response

Your answer is correct.
You have used the scanf and printf functions correctly to read and display the read values, i.e. the sum of the first two numbers.

Explanations:

Function scanf("%d%d%d", &a, &b, &a); reads three integers from standard input. The last value read to overwrite the previous value of variable a.

The read values are then displayed using the printf function. So:

The variable a will display the last value read for a.

The variable b will display the value read for b.

The sum of the first two numbers, a + b, will display the sum of the values originally read for a and b.

If you enter the values 5, 2 and -3 in this order, the displayed values will be:

a: -3 (last value read for a)

b: 2

a + b: -1 (sum of initially read values for a and b: 5 + 2 = 7, but last read value for a was -3)

You have shown a clear understanding of how to use the scanf and printf functions.

For any incorrect response

Your answer is incorrect.
In this code, a sequence of three integers is read using the scanf function, and then the values read and the sum of the first two numbers are displayed.
Function scanf("%d%d%d", &a, &b, &a); is used to read three integers. Since the variable a is read twice, the last value read to overwrite the previous value of the variable a.

Then the read values are displayed using the printf function. In this case, the a variable, the b variable, and the sum of the first two numbers (a + b) are displayed.

If we enter the values 5, 2 and -3 in this order, following the instructions in the code:

The first value read is 5 and is stored in the variable a.

The second value read is 2 and is stored in the variable b.

The third value read is -3 and is stored again in the a variable, overwriting the previous value.

Thus, the displayed values will be:

a: -3 (last value read for a)

b: 2

a + b: -1 (sum of initially read values for a and b: 5 + 2 = 7, but last read value for a was -3)

Matching questions

We consider the variables a, b, c, d and e. Write the correct version of the statements, so that the following assignments are not accompanied by conversions that modify the assigned values.

c='a' Choose...
a=3 Choose...
d=-3.452 Choose...
b=2.1 Choose...

Check

We consider the variables a, b, c, d and e. Write the correct version of the statements, so that the following assignments are not accompanied by conversions that modify the assigned values.

c='a' char
a=3 int
d=-3.4
b=2.1

Chec

Answers

Available choices

You must provide at least two questions and th

Question 1

a=3

Answer: int

Question 2

b=2.1

Answer: float

Question 3

c='a'

Answer: char

Question 4

d=-3.452

Answer: float

For previous question we have implemented the formative feedback for:

- Correct answer
- Partilly correct answer
- Incorrect answer

Combined feedback

For any correct response

Your answer is correct and demonstrates a solid understanding of data types and their correct use in C!
You used the appropriate data types for the variables a, b, c, and d and assigned literal values without requiring implicit conversions to change the assigned values. By using the appropriate data types and values correctly, you ensure accurate data storage in variables and avoid unwanted changes.

For any partially correct response

Your answer is partially correct.
In the C language, data types are used to specify the nature of the data stored in variables and how they are interpreted by the program. Here is a full explanation for each data type mentioned in the given problem:

The char data type is used to store characters and is represented by a single byte in memory. Char variables can store a single ASCII character or a special character. In our case, when we assign the value 'a' to the variable c, we store the ASCII code of the character 'a', which is 97. This ensures that the variable c will contain the ASCII value corresponding to the character 'a'.

The double data type is used to store double-precision floating-point real numbers. Variables of type double are represented on 8 bytes in memory and provide higher precision than single-precision floating-point data types. When we assign the value -3.452 to the variable d, we store this value with double precision in memory.

The int data type is used to store integers. Variables of type int are represented by 4 bytes in memory and can store integer values in the range specified by the data type. When we assign the value 3 to the variable a, we store this value as an integer in memory.

The float data type is used to store single-precision floating-point real numbers. Float variables are represented by 4 bytes in memory and provide lower precision than double data types, but take up less memory space. When we assign the value 2.1 to the variable b, we must add the suffix f to specify that the value is a float, like this: 2.1f.

By using the correct data types and appropriate values, we ensure accurate data storage in variables and avoid implicit conversions that could change assigned values or affect data precision.

Options

Show the number of correct responses once the question has finished

For any incorrect response

Your answer is incorrect.
In the C language, data types are used to specify the nature of the data stored in variables and how they are interpreted by the program. Here is a full explanation for each data type mentioned in the given problem:

The char data type is used to store characters and is represented by a single byte in memory. Char variables can store a single ASCII character or a special character. In our case, when we assign the value 'a' to the variable c, we store the ASCII code of the character 'a', which is 97. This ensures that the variable c will contain the ASCII value

Stack implementation in other areas – **Medicine**

The versatility of evaluation systems with integrated learning and feedback extends beyond mathematics and computer science, showing significant benefits in the medical field. For instance, a module designed to help medical students prepare for their licensing exams can be implemented using Moodle Stack. Within this module, tests with integrated formative feedback play a crucial role in enhancing the learning process.

In the context of medical education:

- **Detailed Feedback for Correct Answers:** When students provide correct answers, the system can offer detailed explanations, discuss alternative methods of diagnosis or treatment, and provide additional context that deepens their understanding of the medical concepts.
- **Personalized Feedback for Incorrect Answers:** In cases where students' responses are incorrect, the system can deliver personalized feedback explaining the correct answers, highlighting common misconceptions, and offering specific insights into areas that need further study. This includes explaining why certain symptoms might lead to different diagnoses or the rationale behind specific medical procedures.

Stack implementation in other areas – **Medicine**

- **Formative Learning:** The feedback can also guide students on how to integrate their knowledge across different medical disciplines, helping them understand the interconnections between various aspects of human health, disease mechanisms, and treatment protocols.

Implementing such a system in medical education underscores the importance of content creators who are not only knowledgeable in medicine but also skilled in pedagogical methods. Their expertise is fundamental in creating high-quality, informative content that meets the rigorous standards of medical education and ensures that students are well-prepared for their professional responsibilities.

Ce metode sunt utilizate pentru a calcula frecvența cardiacă?

a. Când ritmul cardiac este neregulat, se măsoară numărul de unde R în 10 secunde și se înmulțește cu 6 pentru a obține frecvența cardiacă. ✔

b. Intervalul QRS se măsoară de la debutul complexului QRS până la sfârșitulundei T.

c. Când ritmul cardiac este regulat, se împarte 1500 la numărul de casete mici (mm pe hartiamilimetrica) dintre două unde R pentru a obține frecvența cardiacă. ✔

d. Când ritmul cardiac este neregulat, se calculează numărul de unde R într-un interval de 6 secunde (30 casete mari =distant dintre doua linii ingrosate pe hartia milimetrica).

e. Intervalul PP, intre doua unde P succesive, este egal cu intervalul RR în ritm neregulat.

Your answer is correct.
Frecventa cardiac reprezinta numarul complexelor QRS inregistrate intr-un minut (60 secunde sau echivalentul a 1500 mm sau 30 casete mari) in caz de ritm regulat sau timp de 6 secunde in caz de ritm neregulat

The correct answers are:
Când ritmul cardiac este regulat, se împarte 1500 la numărul de casete mici (mm pe hartiamilimetrica) dintre două unde R pentru a obține frecvența cardiacă. ,

Când ritmul cardiac este neregulat, se măsoară numărul de unde R în 10 secunde și se înmulțește cu 6 pentru a obține frecvența cardiacă.

Care sunt metodele prin care se poate calcula axa electrică a inimii în plan frontal, conform electrocardiografiei?

a. Metoda paralelogramului și metoda bazată pe sumarizarea vectorilor principali de depolarizare.

b. Metoda paralelogramului ș imetoda observațiilor echidifazice. ✔

c. Metoda derivată din observații echidifazice și metoda de calcul bazată pe proiecția vectorilor în spațiu.

d. Metoda vectorială și metoda derivată din observații echidifazice. ✔

e. Metoda multimodală și metoda observațiilor în timp real.

Your answer is correct.
Axa electrica a inimii se calculeaza prin compunerea a 2 vectori din 2 derivatii diferite sau prin evidentierea un complex echidifazic (suma undelor negative si positive este 0)

The correct answers are:
Metoda paralelogramului ș imetoda observațiilor echidifazice. ,

Metoda vectorială și metoda derivată din observații echidifazice.

Care afirmații sunt adevărate despre intervalul PR?

- a. Durata normala este între 0.12-0.20 secunde
- b. Intervalul PR se măsoară de la debutul undei P până la debutul complexului QRS ✔
- c. Valoarea normală este 0.22 secunde la tineri ✖
- d. Se măsoară de la începutul undei P la sfârșitul complexului QRS
- e. Valoarea normală este între 0.08-0.10 secunde

Your answer is partially correct.
Durata intervalului PR reprezintă timpul de conducere al impulsului electric de la generarea lui de nodul sinusal până la traversarea nodului atrioventricular, deci măsurarea acestuia include și unda P și nu include complexul QRS; durata variază între 0.12 și 0.20 secunde (0.22 secunde la vârsta de peste 65 de ani).

You have correctly selected 1.
The correct answers are:
Intervalul PR se măsoară de la debutul undei P până la debutul complexului QRS ,

Durata normala este între 0.12-0.20 secunde

Cum se măsoară frecventa complexelor QRS?

- a. Se măsoară de la vârful unei unde R la vârful următoarei unde R.
- b. Intervalul dintre vârful undelor R succesive. ✔
- c. Se măsoară între două unde P succesive.
- d. Se măsoară de la începutul undei R la sfârșitul undei P. ✖
- e. Intervalul dintre începutul undei P și începutul complexului QRS.

Your answer is partially correct.
Intervalul R-R se referă la diferența dintre două bătăi consecutive ale inimii si reprezinta distanta dintre doua unde R succesive masurata la varful acestora.

You have correctly selected 1.
The correct answers are:
Intervalul dintre vârful undelor R succesive. ,

Se măsoară de la vârful unei unde R la vârful următoarei unde R.

Care dintre următoarele afirmații despre sistemul excitoconductor al inimii sunt corecte?

- a. Ramura stângă dă naștere fasciculelor anteroinferior și posterosuperior ✖
- b. Fasciculul His este irigat doar de arteracoronara stângă.
- c. Nodul sinusal se află la nivelul atriului drept, la joncțiunea dintre vena cavă superioară și auricului drept.
- d. Fasciculul His este irigat doar de artera coronară dreaptă. ✖
- e. Nodul atrioventricular este continuat de fasciculul His care se divide în două ramuri, una dreaptă și una stângă.

Your answer is incorrect.
Sistemul de conducer ceste format din nodul sinusal(care se află la nivelul peretelui posterior al atriului drept, superior de creasta terminală), nodulul atrioventricular și fasciculul His ce se divide și ramurile stângă și dreaptă; ramura stângă se divide în fasciculul anterosuperior și posteroinferior; vascularizația fasciculului His are origine dublă.

The correct answers are:
Nodul sinusal se află la nivelul atriului drept, la joncțiunea dintre vena cavă superioară și auricului drept. ,

Nodul atrioventricular este continuat de fasciculul His care se divide în două ramuri, una dreaptă și una stângă.

Care afirmații sunt adevărate despre intervalul QT?

- a. Intervalul QT crește odată cu creșterea frecvenței cardiace. ✖
- b. Intervalul QT se măsoară de la debutul complexului QRS până la sfârșitul undei T
- c. Valoarea normală a intervalului QT corectată (QTc) este de ≤0.30 secunde la bărbațiși ≤0.43 secunde la femei. ✖
- d. Scăderea frecvenței cardiace nu are nicio influență asupra intervalului QT. ✖
- e. Reprezintă durata sistolei electrice a inimii.

Your answer is incorrect.
Intervalul QT reprezintă perioada de activitate electrică a ventriculilor, cu o durată influențată invers proporțional de frecvența cardiacă,avand o valoare normala ≤0.40 la bărbați, respectiv ≤0.43 secunde la femei.

The correct answers are:
Intervalul QT se măsoară de la debutul complexului QRS până la sfârșitul undei T ,

Reprezintă durata sistolei electrice a inimii.

According to those illustrated, the combination of a virtualization system that allows the collaborative integration of software that shares data systems, and the implementation of a STACK system together with the Moodle platform, all these together, constitute a solid base on which systems can be built assisted learning, even in test modules. We return with the clarification that all this transfers the difficulty in the scientific design of the implementation and is based entirely on the ability of the teaching staff to understand the learning process and the technical mastery of pedagogical psychology.