Assignment 11

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

1) Consider the following Boolean model where A and C are constitutively expressed genes:

\[ X = \begin{cases} 1 & \text{if } \text{Not} \ A \text{ or } C = 1 \\ 0 & \text{otherwise} \end{cases} \]

\[ Y = \begin{cases} 1 & \text{if} \ 2A \text{ and } C = 1 \\ 0 & \text{otherwise} \end{cases} \]

\[ Z = \begin{cases} 1 & \text{if} \ A \text{ and } C = 1 \\ 0 & \text{otherwise} \end{cases} \]

1. The network exhibits bistability in the expression of gene X if the genes B and C are co-expressed.
2. The network has no point attractor.

Which of the following statements is TRUE?

- Only 1 is TRUE
- Only 2 is TRUE
- Both 1 and 2 are TRUE

No, the answer is incorrect.
Score: 0

Accepted Answers:

- Only 1

Consider below Boolean model of a gene regulatory network:

\[ G_1 = G_1 \]

\[ G_2 = G_2 \]

\[ G_3 = G_3 \]

\[ G_4 = G_4 \]

\[ G_5 = G_5 \]

\[ G_6 = G_6 \]

2) Which of the following is a cycle attractor for the above gene regulatory network?

- \( G_1 \), \( G_2 \), \( G_3 \), \( G_4 \), \( G_5 \), \( G_6 \)
- \( G_1 \), \( G_2 \), \( G_3 \), \( G_4 \), \( G_5 \), \( G_6 \)
- \( G_1 \), \( G_2 \), \( G_3 \), \( G_4 \), \( G_5 \), \( G_6 \)
- \( G_1 \), \( G_2 \), \( G_3 \), \( G_4 \), \( G_5 \), \( G_6 \)

No, the answer is incorrect.
Score: 0

Accepted Answers:

- \( G_1 \), \( G_2 \), \( G_3 \), \( G_4 \), \( G_5 \), \( G_6 \)

3) Which of the following is the point attractor obtained from the above Boolean model?

- \( G_1 \), \( G_2 \), \( G_3 \), \( G_4 \), \( G_5 \), \( G_6 \)
- \( G_1 \), \( G_2 \), \( G_3 \), \( G_4 \), \( G_5 \), \( G_6 \)
- \( G_1 \), \( G_2 \), \( G_3 \), \( G_4 \), \( G_5 \), \( G_6 \)
- \( G_1 \), \( G_2 \), \( G_3 \), \( G_4 \), \( G_5 \), \( G_6 \)

No, the answer is incorrect.
Score: 0

Accepted Answers:

- \( G_1 \), \( G_2 \), \( G_3 \), \( G_4 \), \( G_5 \), \( G_6 \)

4) Which of the following statements can be inferred from the given Boolean model? Initially \( G_2 \) is expressed, i.e., \( G_2 = 1 \).

- When \( G_1 \) is not expressed, \( G_2 \) continues to be expressed.
- When \( G_1 \) is not expressed, \( G_2 \) is repressed in the next instant.
- When \( G_1 \) is expressed, \( G_2 \) continues to be expressed.
- When \( G_1 \) is expressed, \( G_2 \) is repressed in the next instant.

No, the answer is incorrect.
Score: 0

Accepted Answers:

- When \( G_1 \) is not expressed, \( G_2 \) continues to be expressed.
- When \( G_1 \) is not expressed, \( G_2 \) is repressed in the next instant.

5) Which of the following statements can be inferred from the given Boolean model?

- If \( G_2 \) is 0, \( G_2 \) is 0.
- If \( G_2 \) is 1, \( G_2 \) is 0.
- If \( G_2 \) is 0, \( G_2 \) is 1.
- If \( G_2 \) is 1, \( G_2 \) is 1.

No, the answer is incorrect.
Score: 0

Accepted Answers:

- If \( G_2 \) is 0, \( G_2 \) is 0.
- If \( G_2 \) is 1, \( G_2 \) is 0.

6) Which of the following statements are TRUE?

- Redundancy imparts robustness to a system.
- Robustness leads to improved performance.
- A robust system is fragile against targeted perturbation.
- Homeostasis is an example of robustness in biological systems.

No, the answer is incorrect.
Score: 0

Accepted Answers:

- Redundancy imparts robustness to a system.
- A robust system is fragile against targeted perturbation.