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QUESTION 1

Who was the pioneer of computer programming?

- A. Dame Wendy Hall.
- B. Karen Spark Jones.
- C. Ada Lovelace.
- D. Sophie Wilson

Correct Answer: C

<https://www.techopedia.com/2/31564/watercooler/ada-lovelace-enchantress-of-numbers>

Ada Lovelace was an English mathematician and writer who is widely credited as the pioneer of computer programming. In 1842, she wrote an article in which she outlined the fundamental principles of computing, making her the first person to recognize the potential of computers and to describe algorithms that could be used to program them. Her work laid the basis for modern computing and is recognized as one of the most significant contributions to the field of computing.

References:

<https://www.bcs.org/more/certifications/foundation-certificate-in-artificial-intelligence/>

<https://www.apmg-international.com/en-gb/courses/computing-and-programming/computing-and-programming-foundation-and-certification/>

QUESTION 2

What technique can be adopted when a weak learners hypothesis accuracy is only slightly better than 50%?

- A. Over-fitting
- B. Activation.
- C. Iteration.
- D. Boosting.

Correct Answer: D

Weak Learner: Colloquially, a model that performs slightly better than a naive model.

More formally, the notion has been generalized to multi-class classification and has a different meaning beyond better than 50 percent accuracy. For binary classification, it is well known that the exact requirement for weak learners is to be

better than random guess. [...] Notice that requiring base learners to be better than random guess is too weak for multi-class problems, yet requiring better than 50% accuracy is too stringent.

-Page 46, Ensemble Methods, 2012.

It is based on formal computational learning theory that proposes a class of learning methods that possess weakly learnability, meaning that they perform better than random guessing. Weak learnability is proposed as a simplification of the

more desirable strong learnability, where a learner achieved arbitrary good classification accuracy. A weaker model of learnability, called weak learnability, drops the requirement that the learner be able to achieve arbitrarily high accuracy; a

weak learning algorithm needs only output an hypothesis that performs slightly better (by an inverse polynomial) than random guessing.

-The Strength of Weak Learnability, 1990.

It is a useful concept as it is often used to describe the capabilities of contributing members of ensemble learning algorithms. For example, sometimes members of a bootstrap aggregation are referred to as weak learners as opposed to

strong, at least in the colloquial meaning of the term.

More specifically, weak learners are the basis for the boosting class of ensemble learning algorithms.

The term boosting refers to a family of algorithms that are able to convert weak learners to strong learners.

<https://machinelearningmastery.com/strong-learners-vs-weak-learners-for-ensemble-learning/>

The best technique to adopt when a weak learner's hypothesis accuracy is only slightly better than 50% is boosting. Boosting is an ensemble learning technique that combines multiple weak learners (i.e., models with a low accuracy) to create

a more powerful model. Boosting works by iteratively learning a series of weak learners, each of which is slightly better than random guessing. The output of each weak learner is then combined to form a more accurate model. Boosting is a

powerful technique that has been proven to improve the accuracy of a wide range of machine learning tasks. For more information, please see the BCS Foundation Certificate In Artificial Intelligence Study Guide or the resources listed above.

QUESTION 3

Sustainability focuses on which three core areas?

- A. Scientific, Environmental and Economic.
- B. Social, Economic and Environmental.
- C. Social, Economic and Entrepreneurial.
- D. Social, Entrepreneurial and Environmental.

Correct Answer: B

The term sustainability is broadly used to indicate programs, initiatives and actions aimed at the preservation of a particular resource. However, it actually refers to four distinct areas: human, social, economic and environmental ?known as the

four pillars of sustainability.

<https://www.futurelearn.com/info/courses/sustainable-business/0/steps/78337#:~:text=However%2C%20it%20actually%20refers%20to,the%20four%20pillars%20of%20sustainability.andtext=Human%20sustainability%20aims%20to%20m>

aintain%20and%20improve%20the%20human%20capital%20in%20society. Sustainability focuses on these three core areas because they all have an impact on the environment and society. Social sustainability is concerned with the

relationships between people and how to create a society that is equitable and fair for all members. Economic sustainability focuses on the creation of a viable economic system that provides for the needs of the present without compromising

the ability of future generations to meet their own needs. Environmental sustainability focuses on protecting natural resources, ecosystems and habitats, and minimizing the impact of human activities on the environment.

References: <https://www.bcs.org/more/certifications/foundation-certificate-in-artificial-intelligence/>

<https://www.apmg-international.com/en-gb/courses/sustainability/sustainability-foundation-and-certification/>

QUESTION 4

A vector in vector calculus is a quantity that has magnitude and direction.

What is a vector in computer programming?

- A. An array with one dimension.
- B. A two-dimensional array of scalars.
- C. An array of complex numbers
- D. A constant

Correct Answer: A

In computer programming, a vector is a data structure that contains a collection of elements that are all of the same type. Each element in the vector has an associated index, which can be used to access and modify the element at that index.

Vectors are commonly used to store collections of numerical values (e.g., integers or floating-point numbers) or strings, but they can also be used to store any type of data.

References:

[1] BCS Foundation Certificate In Artificial Intelligence Study Guide, Page number 36

[2] APMG International, "What is a Vector in Computer Programming?", <https://apmg-international.com/en/blog/what-is-a-vector-in-computer-programming/>

[3] EXIN, "What is a Vector in Computer Programming?", <https://www.exin.com/blog/what-is-a-vector-in-computer-programming/>

QUESTION 5

The EU's Ethical Guidelines use what to demonstrate trustworthy AI?

- A. A quality assurance plan.
- B. UN's sustainability goals.
- C. Customer feedback.
- D. A human-centric value system.

Correct Answer: D

The European Union's Ethical Guidelines for Trustworthy AI use a human-centric value system to demonstrate that Artificial Intelligence (AI) is trustworthy. This value system is based on human rights, autonomy, safety, privacy, transparency,

accountability and fairness. The guidelines also state that AI should be designed, developed and used in a manner that respects these values.

References:

<https://ec.europa.eu/digital-single-market/en/news/ethical-guidelines-trustworthy-ai>

BCS Foundation Certificate In Artificial Intelligence Study Guide (2019), A.I and Ethics, Chapter 5.

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