



European IT Certification Curriculum Self-Learning Preparatory Materials

EITC/AI/TFQML
TensorFlow Quantum Machine Learning



This document constitutes European IT Certification curriculum self-learning preparatory material for the EITC/AI/TFQML TensorFlow Quantum Machine Learning programme.

This self-learning preparatory material covers requirements of the corresponding EITC certification programme examination. It is intended to facilitate certification programme's participant learning and preparation towards the EITC/AI/TFQML TensorFlow Quantum Machine Learning programme examination. The knowledge contained within the material is sufficient to pass the corresponding EITC certification examination in regard to relevant curriculum parts. The document specifies the knowledge and skills that participants of the EITC/AI/TFQML TensorFlow Quantum Machine Learning certification programme should have in order to attain the corresponding EITC certificate.

Disclaimer

This document has been automatically generated and published based on the most recent updates of the EITC/AI/TFQML TensorFlow Quantum Machine Learning certification programme curriculum as published on its relevant webpage, accessible at:

<https://eitca.org/certification/eitc-ai-tfqml-tensorflow-quantum-machine-learning/>

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: INTRODUCTION****TOPIC: INTRODUCTION TO GOOGLE AI QUANTUM**

This part of the material is currently undergoing an update and will be republished shortly.

EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - INTRODUCTION - INTRODUCTION TO GOOGLE AI QUANTUM - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: INTRODUCTION****TOPIC: INTRODUCTION TO QUANTUM COMPUTING**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: IMPLEMENTING QUANTUM COMPUTER****TOPIC: BUILDING A QUANTUM COMPUTER WITH SUPERCONDUCTING QUBITS**

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**EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - IMPLEMENTING QUANTUM COMPUTER
- BUILDING A QUANTUM COMPUTER WITH SUPERCONDUCTING QUBITS - REVIEW QUESTIONS:**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: PROGRAMMING QUANTUM COMPUTER****TOPIC: PROGRAMMING A QUANTUM COMPUTER WITH CIRQ**

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**EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - PROGRAMMING QUANTUM COMPUTER
- PROGRAMMING A QUANTUM COMPUTER WITH CIRQ - REVIEW QUESTIONS:**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: QUANTUM SUPREMACY****TOPIC: QUANTUM SUPREMACY EXPLAINED**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: QUANTUM SUPREMACY****TOPIC: CONTROL OF TRANSMON QUBITS USING A CRYOGENIC CMOS INTEGRATED CIRCUIT**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - QUANTUM SUPREMACY - CONTROL OF TRANSMON QUBITS USING A CRYOGENIC CMOS INTEGRATED CIRCUIT - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: QUANTUM SUPREMACY****TOPIC: QUANTUM SUPREMACY: BENCHMARKING THE SYCAMORE PROCESSOR**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - QUANTUM SUPREMACY - QUANTUM SUPREMACY: BENCHMARKING THE SYCAMORE PROCESSOR - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: QUANTUM SUPREMACY****TOPIC: EXTRACTING COHERENCE INFORMATION FROM RANDOM CIRCUITS**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - QUANTUM SUPREMACY - EXTRACTING COHERENCE INFORMATION FROM RANDOM CIRCUITS - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: QUANTUM SUPREMACY****TOPIC: ESTIMATION OF STATISTICAL SIGNIFICANCE OF QUANTUM SUPREMACY**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - QUANTUM SUPREMACY - ESTIMATION OF STATISTICAL SIGNIFICANCE OF QUANTUM SUPREMACY - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: OVERVIEW OF TENSORFLOW QUANTUM****TOPIC: TENSORFLOW QUANTUM: A SOFTWARE PLATFORM FOR HYBRID QUANTUM-CLASSICAL ML**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - OVERVIEW OF TENSORFLOW QUANTUM - TENSORFLOW QUANTUM: A SOFTWARE PLATFORM FOR HYBRID QUANTUM-CLASSICAL ML - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: OVERVIEW OF TENSORFLOW QUANTUM****TOPIC: LAYER-WISE LEARNING FOR QUANTUM NEURAL NETWORKS**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - OVERVIEW OF TENSORFLOW QUANTUM - LAYER-WISE LEARNING FOR QUANTUM NEURAL NETWORKS - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: PRACTICAL TENSORFLOW QUANTUM - BINARY CLASSIFIER****TOPIC: USING TENSORFLOW QUANTUM FOR SIMPLE QUANTUM BINARY CLASSIFICATION**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - PRACTICAL TENSORFLOW QUANTUM - BINARY CLASSIFIER - USING TENSORFLOW QUANTUM FOR SIMPLE QUANTUM BINARY CLASSIFICATION - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: PRACTICAL TENSORFLOW QUANTUM - XOR PROBLEM****TOPIC: SOLVING THE XOR PROBLEM WITH QUANTUM MACHINE LEARNING WITH TFQ**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - PRACTICAL TENSORFLOW QUANTUM - XOR PROBLEM - SOLVING THE XOR PROBLEM WITH QUANTUM MACHINE LEARNING WITH TFQ - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: PRACTICAL TENSORFLOW QUANTUM - XOR PROBLEM****TOPIC: QUANTUM XOR DECISION BOUNDARY WITH TFQ**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - PRACTICAL TENSORFLOW QUANTUM - XOR PROBLEM - QUANTUM XOR DECISION BOUNDARY WITH TFQ - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: QUANTUM REINFORCEMENT LEARNING****TOPIC: REPLICATING REINFORCEMENT LEARNING WITH QUANTUM VARIATIONAL CIRCUITS WITH TFQ**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - QUANTUM REINFORCEMENT LEARNING - REPLICATING REINFORCEMENT LEARNING WITH QUANTUM VARIATIONAL CIRCUITS WITH TFQ - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: QUANTUM APPROXIMATE OPTIMIZATION ALGORITHM (QAOA)****TOPIC: QUANTUM APPROXIMATE OPTIMIZATION ALGORITHM (QAOA) WITH TENSORFLOW QUANTUM**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - QUANTUM APPROXIMATE OPTIMIZATION ALGORITHM (QAOA) - QUANTUM APPROXIMATE OPTIMIZATION ALGORITHM (QAOA) WITH TENSORFLOW QUANTUM - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: VARIATIONAL QUANTUM EIGENSOLVER (VQE)****TOPIC: VARIATIONAL QUANTUM EIGENSOLVER (VQE) IN TENSORFLOW QUANTUM FOR SINGLE QUBIT HAMILTONIANS**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - VARIATIONAL QUANTUM EIGENSOLVER (VQE) - VARIATIONAL QUANTUM EIGENSOLVER (VQE) IN TENSORFLOW QUANTUM FOR SINGLE QUBIT HAMILTONIANS - REVIEW QUESTIONS:

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: VARIATIONAL QUANTUM EIGENSOLVER (VQE)****TOPIC: VARIATIONAL QUANTUM EIGENSOLVER (VQE) IN TENSORFLOW-QUANTUM FOR 2 QUBIT HAMILTONIANS**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING DIDACTIC MATERIALS**LESSON: VARIATIONAL QUANTUM EIGENSOLVER (VQE)****TOPIC: OPTIMIZING VQE'S WITH ROTOSOLVE IN TENSORFLOW QUANTUM**

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EITC/AI/TFQML TENSORFLOW QUANTUM MACHINE LEARNING - VARIATIONAL QUANTUM EIGENSOLVER (VQE) - OPTIMIZING VQE'S WITH ROTOSOLVE IN TENSORFLOW QUANTUM - REVIEW QUESTIONS:

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