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Islamabad



# ARTIFICIAL INTELLIGENCE DATA TECHNICIAN



## TRAINER GUIDE

National Vocational Certificate Level 2

Version 1 - November, 2019



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## **Introduction**

Competence-based training helps to bridge the gap between what is taught in training and what tasks will be performed on the job. Training trainees to perform actual job functions helps to ensure that future front-line workers have the skills, knowledge and abilities required to perform their jobs properly, safely and effectively. In addition to competence-based training, assessment based on the performance of actual work competencies helps to ensure that:

- trainees are performing their work tasks as safely as possible
- performance gaps are recognized prior to serious incidents
- Training can be implemented to improve competence.

There are significant benefits to competence-based training:

### **1. Cost effectiveness**

Since training activities and assessments in a competence-based approach are goal-oriented, trainers focus on clearly defined areas of skills, knowledge and understanding that their own industry has defined in the competence standards. At the same time, trainees are more motivated to learn when they realize the benefits of improved performance.

### **2. Efficiency**

The transfer gap between the training environment and working on the job is reduced substantially in a competence-based approach. This is because training and assessment are relevant to what needs to be done on the job. As a result, it takes less time for trainees to become competent in the required areas. This, in turn, contributes to improved efficiency where training and assessment are concerned.

### **3. Increased productivity**

When trainees become competent in the competence standards that their own industry has defined, when they know what the performance expectations are and receive recognition for their abilities through successful assessments, they are likely to be more motivated and experience higher job satisfaction. The result is improved productivity for organizations. The communication and constructive feedback between future employers and employees will improve as a result of a competence-based approach, which can also increase productivity.

### **4. Reduced risk**

Using a competence-based approach to training, development, and assessment, employers are able to create project teams of people with complementary skills. A trainee's record of the skills, knowledge and understanding relating to the competence standards they have achieved can be used by a future employer to identify and provide further relevant training and assessment for new skills areas. Competence standards can shape employee development and promotional paths within an organization and give employees the opportunity to learn more competencies beyond their roles. It can also provide organizations with greater ability to scale and flex as needed, thereby reducing the risk they face.

## **5. Increased customer satisfaction**

Employees who have been trained and assessed using a competence-based approach are, by the definition of the relevant competence standards, able to perform the required tasks associated with a job. The knock-on effect is that, in service-related industries, they are able to provide high service levels, thereby increasing customer satisfaction. In production or manufacturing industries, they are able to work closely to industry standards in a more effective and efficient way.

### **Lesson plans**

This manual provides a series of lesson plans that will guide delivery of each module for the *Android Application Developer* qualification. It is important for trainers to be flexible and be ready to adapt lesson plans to suit the context of the subject and the needs of their trainees.

Good teachers acknowledge that CBT means each and every trainee in the class learns at a different speed. The good teacher is prepared to throw aside the day's lesson plan and do something different (and unplanned) for the class even if it means 'writing' a lesson plan for each trainee to match their learning pace for that day or week.

Learning by doing is different from learning theory and then applying it. To learn to do something, trainees need someone looking over their shoulder saying 'it's not quite like that, it's like this', 'you do it like this because ...', or even 'tell me why you chose to do it like this?'.

In this way, trainees learn that theoretical knowledge is meaningless if it is not seen in the context of what they are doing. In other words, if a trainee doesn't know why they do something, they will not do it competently (skills underpinned by knowledge = competent performer).

This is how an *Android Application Developer* acquires a practical grasp of the standards expected. It's not by learning it in theory, but because those standards are acquired through correction by people who show what the standards are, and correct the trainee where they do not meet those standards, and where they repeat it correction until they have internalized those standards.

### **Demonstration of skill**

Demonstration or modeling a skill is a powerful tool, which is used, in vocational training. The instructions for trainers for demonstration are as under:

- a) Read the procedure mentioned in the Trainer Guide for the relevant Learning Unit before demonstration.
- b) Arrange all tools, equipment and consumable material, which are required for demonstration of a skill.
- c) Practice the skill before demonstration to trainees, if possible.
- d) Introduce the skill to trainees clearly at the commencement of demonstration.
- e) Explain how the skill relates to the skill(s) already acquired and describe the expected results or show the objects to trainees.
- f) Carry out demonstration in a way that can be seen by all trainees.
- g) Use the same tools and materials that the learner will be using.
- h) Go through EACH of the steps involved in performing the skill.
- i) Go SLOWLY - describe each step as it is completed.
- j) Encourage the learners to move around and watch what you are doing from a number of different angles.

- k) Identify critical or complex steps, or steps that involve safety precautions to be followed.
- l) Explain theoretical knowledge where applicable and ask questions to trainees to test their understanding.
- m) Try to involve the learners: Ask them questions about why they think the process may work that way.
- n) Repeat critical steps in demonstration, if required.
- o) Summarize the demonstration by asking questions to trainees.

Involvement in the process (actively seeing) is important at this stage. When you work on getting involved, getting people to participate, you make them a part of what is happening. Questions for clarification or explanation are important throughout the demonstration. It is up to the learners to ask questions about things they do not understand, but it is also important for trainers to seek out and elicit questions from learners. A trainer may need to do repeated demonstrations of difficult or complex skills.

## Overview of the program

<b>Course:</b> Artificial Intelligence Data Technician	<b>Total Course Duration:</b> 3200 hours
<b>Course Overview:</b>	
<p><i>The competency based NVQ has been developed to train the unskilled men and women of Pakistan on the technical and entrepreneurial skills to be employed / self-employed and inevitably set sustainable impact on their lives by increase in their livelihood income generation.</i></p> <p><i>The purpose of these qualifications is to set professional standards for Artificial Intelligence Data Technician, who will serve as key elements enhancing quality of Pakistan's Software Developing Industry.</i></p>	

Module Title and Aim	Learning Units	Duration
<b>Module 7:</b> Use the spreadsheets <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to use the spreadsheets	<b>LU1:</b> Perform Cell Data Manipulation <b>LU2:</b> Perform Filtering and Sorting of numerical data <b>LU3:</b> Apply Basic and Database Formulae <b>LU4:</b> Create Pivot Table <b>LU5:</b> Perform data plotting	100 hrs
<b>Module 8:</b> Comply with Personal Health and Safety Guidelines <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Comply with Personal Health and Safety Guidelines	<b>LU1:</b> Identify Personal Hazards at Workplace <b>LU2:</b> Apply Personal Protective and Safety Equipment (PPE) <b>LU3:</b> Comply with Occupational Safety and Health (OSH) <b>LU4:</b> Dispose the hazardous Waste materials from the designated area.	

Module Title and Aim	Learning Units	Duration
<b>Module 9:</b> Communicate the Workplace Policy and Procedure <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Communicate the Workplace Policy and Procedure	<b>LU1:</b> Identify workplace communication procedures <b>LU2:</b> Communicate at workplace <b>LU3:</b> Draft the Written Information <b>LU4:</b> Review the Documents	
<b>Module 10:</b> Perform Basic Communication (Specific) <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Perform Basic Communication (Specific)	<b>LU1:</b> Communicate in a team to achieve intended outcomes <b>LU2:</b> Follow Supervisor's instructions as per organizational SOPs <b>LU3:</b> Develop Generic communication skills at workplace	
<b>Module 11:</b> Develop Entrepreneurial Skills <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Develop Entrepreneurial Skills	<b>LU1:</b> Develop a business plan <b>LU2:</b> Collect information regarding funding sources <b>LU3:</b> Develop a marketing plan <b>LU4:</b> Develop basic business communication skills	

Module Title and Aim	Learning Units	Duration
<b>Module 12:</b> Demonstrate Basic Numeracy Skills <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Demonstrate Basic Numeracy Skills	<b>LU1:</b> Perform basic mathematical skills <b>LU2:</b> Perform Measurement <b>LU3:</b> Calculate Area and Volume aggregate	
<b>Module 13:</b> Use Multimedia Processing <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Use Multimedia Processing	<b>LU1:</b> Manipulate Image for Pre-processing <b>LU2:</b> Manipulate Video for Pre-processing <b>LU3:</b> Manipulate Audio for Pre-processing	100 hrs
<b>Module 14:</b> Pre-Process Data <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Pre-Process Data	<b>LU1:</b> Digitize Manual Data <b>LU2:</b> Prepare Data in required format <b>LU3:</b> Label Image Data <b>LU4:</b> Label Audio Data <b>LU5:</b> Label Text Data <b>LU6:</b> Label Video Data	100 hrs
<b>Module 15:</b> Perform Basic Computer Application (Specific)	<b>LU1:</b> Create Word Documents <b>LU2:</b> Use internet for Browsing	

Module Title and Aim	Learning Units	Duration
<p><b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Perform Basic Computer Application (Specific)</p>		

FORMAT FOR LESSON PLAN				
<b>Module13: Use Multimedia Processing</b>				
<b>Learning Unit 1: Manipulate Image for Pre-processing</b>				
Methods	Key Notes	Media Time		
	The tools, material and techniques used to manipulate Image for Pre-processing			
<b>Introduction</b>				
This session will introduce learners to the tools, techniques and material used for preparing workstation for winch dyeing, using presentation, demonstration, question and answer, and practical skills development.				
<b>Main Body</b>				
<ul style="list-style-type: none"> <li>• Convert image into specified format using suitable tools</li> <li>• Change resolution to the specified requirements</li> <li>• Crop the image to remove unwanted artifacts using suitable tools</li> <li>• Merge multiple images using suitable tools</li> <li>• Overlay text using suitable tools</li> <li>• Resize the image to specified size using suitable tools</li> <li>• Adjust image orientation to specified requirement using suitable tools</li> <li>• Prepare text-based images for OCR (optical character recognition) using suitable tools</li> </ul>				
<b>Conclusion</b>				
To conclude the session, review the tools, techniques and material used for using IT Fundamentals to operate the computer. Give learners the opportunity to ask questions.				
<b><u>Assessment</u></b>				
Question and answer, discussion groups with feedback, observation of practice skills development				

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Module-7

TRAINER GUIDE

National Vocational Certificate Level 2

Version 1 - November, 2019

## Trainer's guidelines

Module 7: 061900925 Use of Spreadsheet			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<b>LU1: Perform Cell Data Manipulation</b>	<p>Deliver an illustrated presentation on how to Perform Cell Data Manipulation Ensure that the presentation focuses on the following:</p> <ul style="list-style-type: none"> <li>• Launch word processing application</li> <li>• Create a blank document</li> <li>• Create from template</li> <li>• Create content</li> <li>• Identify saved location</li> <li>• Save a document in desired format</li> </ul> <p>Learners need to devise 10 quiz questions with answers based on Perform Cell Data Manipulation They must make sure their questions cover key topics for create a file</p> <p>Issue each learner with 10 blank cards. Each learner should number the cards and write their name on one side with a question about Perform Cell Data Manipulation On the reverse of the card, they should write an appropriate answer to their question.</p> <p>For the quiz, arrange learners in two equal teams. Ask one learner to keep score using a suitable scorecard. Player 1</p>	Practical Classrooms labs, Learner Guide Handouts Videos Multi-media projector	

Module 7: 061900925 Use of Spreadsheet			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
	<p>for Team A asks one of their questions to Player 1 of Team B, who needs to answer the question. Discuss the answer with the group and ask the group to determine if the answer is correct. Player 1 of Team A then confirms the answer they had devised. (You need to correct answers if the learner's answer was not wholly correct.)</p> <p>The scorekeeper records 1 mark for a correct answer under the appropriate team's score column. Play then passes to Player 1 of Team B, who asks their question to Player 1 of Team A, and so on.</p> <p>Total the scores at the end of the quiz to see which team won.</p> <p>After the quiz, collect learners' question/answer cards and check that answers provided were correct. Return any incorrect answers to learners and ask them to change their answer to the correct one.</p> <p>Demonstrate the materials needed for Perform Cell Data Manipulation Enable learners to practice using the appropriate materials for using perform cell data manipulation in a controlled environment.</p> <p>Learners must be able to practice and develop their knowledge and skills relating to using how to create a file. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		

Module 7: 061900925 Use of Spreadsheet			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU2: <b>Perform Filtering and Sorting of numerical data</b>	<p>Lead a discussion on how to Perform filtering and sorting of numerical data. Encourage ALL trainees to participate in the discussion. Ensure that the discussion addresses the following points:</p> <ol style="list-style-type: none"> <li>1. Sort data in ascending order</li> <li>2. Sort data in descending order</li> <li>3. Apply single level filter</li> <li>4. Apply multi-level filter</li> </ol> <p>Learners need to devise 10 quiz questions with answers based on how to Perform filtering and sorting of numerical data. They must make sure their questions cover key topics for how to Perform filtering and sorting of numerical data.</p> <p>Issue each learner with 10 blank cards. Each learner should number the cards and write their name on one side with a question about how to Perform filtering and sorting of numerical data. On the reverse of the card, they should write an appropriate answer to their question.</p> <p>For the quiz, arrange learners in two equal teams. Ask one learner to keep score using a suitable scorecard. Player 1 for Team A asks one of their questions to Player 1 of Team B, who needs to answer the question. Discuss the answer with the group and ask the group to determine if the answer is correct. Player 1 of Team A then confirms the answer they had devised. (You need to correct answers if the learner's answer was not wholly correct.)</p> <p>The scorekeeper records 1 mark for a correct answer under the appropriate team's score column. Play then passes to Player 1 of Team B, who asks their question to Player 1 of Team A, and so on.</p> <p>Total the scores at the end of the quiz to see which team won.</p>	Practical Classrooms labs,	Learner Guide Handouts Videos Multi-media projector

Module 7: 061900925 Use of Spreadsheet			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU3: <b>Apply Basic and Database Formulae</b>	<p>Lead a discussion on how to apply basic and database formulae. Encourage ALL trainees to participate in the discussion. Ensure that the discussion addresses the following points</p> <ul style="list-style-type: none"> <li>- Create different types of data series</li> <li>- Apply arithmetic formula</li> <li>- Apply concatenation formula</li> <li>- Calculate string length using formula</li> <li>- Select desired part of string using formula</li> <li>- Copy formula using different cell referencing.</li> <li>- Use Look-up function</li> <li>- Use Count Formula</li> <li>- Use Find formula</li> <li>- Take data sum, sub, max, min, variance, mean, median, average, round using formula</li> <li>- Take count of entities using formula</li> <li>- Take count of blanks using formula</li> <li>- Calculate minimum of entities using formula</li> <li>- Calculate maximum of entities using formula</li> <li>- Select entity based on condition</li> </ul> <p>Learners need to devise 10 quiz questions with answers based on how to apply basic and database formulae. They must make sure their questions cover key topics for how to apply basic and database formulae.</p> <p>Issue each learner with 10 blank cards. Each learner should number the cards and write their name on one side with a question about how to apply basic and database formulae. On the reverse of the card, they should write an appropriate answer to their question.</p> <p>For the quiz, arrange learners in two equal teams. Ask one learner to keep score using a suitable score-card. Player 1 for Team A asks one of their questions to Player 1 of Team B, who needs to answer the question. Discuss the answer</p>	Practical Classrooms	labs, Learner Guide Handouts Videos Multi-media projector

Module 7: 061900925 Use of Spreadsheet			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<b>LU4: Create Pivot Table</b>	<p>Deliver an illustrated presentation on how to create a pivot table. Ensure that the presentation focuses on the following:</p> <ol style="list-style-type: none"> <li>1. Select input data</li> <li>2. Arrange data in an appropriate format</li> <li>3. Specify output location</li> <li>4. Apply pivot table operation</li> </ol> <p>Prepare either:</p> <ul style="list-style-type: none"> <li>• A flip chart</li> <li>• A PowerPoint slides</li> <li>• A handout</li> </ul> <p>...showing key topics for how to create a pivot table. Learners need to work in small groups discussing the key topics. Each group should make notes from their discussions that identify three main points that related to each key topic.</p> <p>After the discussion, begin the feedback session. Ask one group to share the main points they have recorded for the first key topic for how to create a pivot table. Discuss these main points briefly with the whole group. Learners should make additional notes to record additional points their group had not identified.</p> <p>Then ask the next group to share the main points they have recorded for the second key topic. Repeat the discussion process. Continue until you have covered all the key topics.</p> <p>End the group discussion activity with a summary.</p> <p>Demonstrate the materials needed for how to create a pivot table. Enable learners to practice using the appropriate materials for how to create a pivot table in a</p>	<p>Practical Classrooms</p> <p>labs,</p>	<p>Learner Guide Handouts Videos Multi-media projector</p>

Module 7: 061900925 Use of Spreadsheet			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<b>LU5: Perform Data Plotting</b>	<p>Lead a brainstorm on how to perform data plotting. List the brainstorm ideas on a flipchart. If necessary, prompt learners to consider the following:</p> <ol style="list-style-type: none"> <li>1. Specify data to plot</li> <li>2. Specify chart type</li> <li>3. Format chart</li> <li>4. Apply designs to chart</li> </ol> <p>Prepare either:</p> <ul style="list-style-type: none"> <li>• A flip chart</li> <li>• A PowerPoint slide</li> <li>• A handout</li> </ul> <p>...showing the key topics about how to perform data plotting. Go through all the key topics briefly and then allocate one key topic to each group.</p> <p>Learners need to work in their small groups discussing the key topic that has been allocated to their group. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic.</p> <p>After the discussion, begin the feedback session. Ask one group to come to the front of the class with their flipchart. Put up the flipchart where it can be easily seen by other learners. Ask the group to share the main points they have recorded for their key topic for how to perform data plotting. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified.</p> <p>Then ask the next group to share their flipchart showing the main points they have recorded for the next key topic.</p>	Practical Classrooms  labs,	Learner Guide  Handouts  Videos  Multi-media projector

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Module-8

TRAINER GUIDE

National Vocational Certificate Level 2

Version 1 - November, 2019

<b>Module 8: Comply Personal Health and Safety Guidelines</b>			
<b>Learning Unit</b>	<b>Suggested Teaching/ Learning Activities</b>	<b>Delivery Context</b>	<b>Media</b>
LU1:			
LU2:			
LU3:			
LU4:			

<b>Module 9: Communicate the Workplace Policy and Procedure</b>			
<b>Learning Unit</b>	<b>Suggested Teaching/ Learning Activities</b>	<b>Delivery Context</b>	<b>Media</b>
LU1:			
LU2:			
LU3:			
LU4:			

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Module-10  
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National Vocational Certificate Level 2

**Version 1 - November, 2019**

<b>Module 10: Perform Basic Communication (Specific)</b>			
<b>Learning Unit</b>	<b>Suggested Teaching/ Learning Activities</b>	<b>Delivery Context</b>	<b>Media</b>
LU1:			
LU2:			
LU3:			
LU4:			

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Module-11

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National Vocational Certificate Level 2

Version 1 - November, 2019

<b>Module 11: Develop Entrepreneurial Skills</b>			
<b>Learning Unit</b>	<b>Suggested Teaching/ Learning Activities</b>	<b>Delivery Context</b>	<b>Media</b>
LU1:			
LU2:			
LU3:			
LU4:			

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Module-12

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National Vocational Certificate Level 2

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<b>Module 12: Demonstrate Basic Numeracy Skills</b>			
<b>Learning Unit</b>	<b>Suggested Teaching/ Learning Activities</b>	<b>Delivery Context</b>	<b>Media</b>
LU1:			
LU2:			
LU3:			
LU4:			

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Module-13

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National Vocational Certificate Level 2

Version 1 - November, 2019

Module 13: 061900926 Use Multimedia processing			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<b>LU1: Manipulate Image for Pre-processing</b>	<p>Deliver an illustrated presentation on how to Manipulate Image for Pre-processing Ensure that the presentation focuses on the following:</p> <ul style="list-style-type: none"> <li>• Convert image into specified format using suitable tools</li> <li>• Change resolution to the specified requirements</li> <li>• Crop the image to remove unwanted artifacts using suitable tools</li> <li>• Merge multiple images using suitable tools</li> <li>• Overlay text using suitable tools</li> <li>• Resize the image to specified size using suitable tools</li> <li>• Adjust image orientation to specified requirement using suitable tools</li> <li>• Prepare text based images for OCR (optical character recognition) using suitable tools</li> </ul>	Practical Classrooms labs,	Learner Guide Handouts Videos Multi-media projector

Module 13: 061900926 Use Multimedia processing			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
	<p>Learners need to devise 10 quiz questions with answers based on Manipulate Image for Pre-processing. They must make sure their questions cover key topics for create a file.</p> <p>Issue each learner with 10 blank cards. Each learner should number the cards and write their name on one side with a question about Manipulate Image for Pre-processing. On the reverse of the card, they should write an appropriate answer to their question.</p> <p>For the quiz, arrange learners in two equal teams. Ask one learner to keep score using a suitable score-card. Player 1 for Team A asks one of their questions to Player 1 of Team B, who needs to answer the question. Discuss the answer with the group and ask the group to determine if the answer is correct. Player 1 of Team A then confirms the answer they had devised. (You need to correct answers if the learner's answer was not wholly correct.)</p> <p>The scorekeeper records 1 mark for a correct answer under the appropriate team's score column. Play then passes to Player 1 of Team B, who asks their question to Player 1 of Team A, and so on.</p> <p>Total the scores at the end of the quiz to see which team won.</p> <p>After the quiz, collect learners' question/answer cards and check that answers provided were correct. Return any incorrect answers to learners and ask them to change their answer to the correct one.</p> <p>Demonstrate the materials needed for Manipulate Image</p>		

Module 13: 061900926 Use Multimedia processing			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
	<p>for Pre-processing Enable learners to practice using the appropriate materials for using basic Language for artificial intelligence in a controlled environment.</p> <p>Learners must be able to practice and develop their knowledge and skills relating to using how to manipulate image for preprocessing. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<b>LU2: Manipulate Video for Pre-processing</b>	<p>Deliver an illustrated presentation on how to Manipulate video for Pre-processing. Ensure that the presentation focuses on the following</p> <ul style="list-style-type: none"> <li>• Convert video into specified format using suitable tools</li> <li>• Change resolution of the video to the specified requirements using suitable tools</li> <li>• Crop the video to remove unwanted duration using suitable tools</li> <li>• Crop the video to remove unwanted contents using suitable tools</li> <li>• Merge multiple videos using suitable tools</li> <li>• Adjust frame rate of video</li> <li>• Extract frames from video to save them in image format</li> <li>• Modify audio tracks of video using suitable tools</li> <li>• Insert identifier in a video</li> </ul>	Practical Classrooms labs,	Learner Guide Handouts Videos Multi-media projector

Module 13: 061900926 Use Multimedia processing			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
	<p>Prepare either:</p> <ul style="list-style-type: none"> <li>• A flip chart</li> <li>• A PowerPoint slide</li> <li>• A handout</li> </ul> <p>...showing the key topics about how to Manipulate video for Pre-processing. Go through all the key topics briefly and then allocate <b>one key topic</b> to each group.</p> <p>Learners need to work in their small groups discussing the key topic that has been allocated to their group. Each group should use a sheet of flip chart paper to record <b>three main points</b> from their discussions that relate to <b>their key topic</b>.</p> <p>After the discussion, begin the feedback session. Ask one group to come to the front of the class with their flipchart. Put up the flipchart where it can be easily seen by other learners. Ask the group to share the main points they have recorded for their key topic for how to Manipulate video for Pre-processing. Discuss these main points briefly with the whole group. Learners should make additional notes <b>on the flip chart</b> to record additional points their group had not identified.</p> <p>Then ask the next group to share their flipchart showing the main points they have recorded for the next key topic. Repeat the discussion process. Continue until you have covered all the key topics.</p> <p>End the group discussion activity with a summary.</p>		

Module 13: 061900926 Use Multimedia processing			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
	<p>Photograph or scan all the flipcharts and use these to create a handout to distribute to all learners.</p> <p>Demonstrate the materials needed for how to Manipulate video for Pre-processing. Enable learners to practice using the appropriate materials for how to Manipulate video for Pre-processing in a controlled environment.</p> <p>Learners must be able to practice and develop their knowledge and skills relating to how to Manipulate video for Pre-processing in an appropriate practical setting. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<b>LU3: Manipulate Audio for Pre-processing</b>	<p>Lead a discussion on how to Manipulate audio for Pre-processing. Encourage ALL trainees to participate in the discussion. Ensure that the discussion addresses the following points:</p> <ul style="list-style-type: none"> <li>- Convert audio into specified format using suitable tools</li> <li>- Adjust bit rate of audio using suitable tools</li> <li>- Reduce noise from audio using suitable tools</li> <li>- Enhance audio for preprocessing</li> </ul> <p>Learners need to devise 10 quiz questions with answers based on how to Manipulate audio for Pre-processing. They must make sure their questions cover key topics for how to Perform word formatting.</p>	Practical Classrooms labs,	Learner Guide Handouts Videos Multi-media projector

Module 13: 061900926 Use Multimedia processing			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
	<p>Issue each learner with 10 blank cards. Each learner should number the cards and write their name on one side with a question about how to Manipulate audio for Pre-processing. On the reverse of the card, they should write an appropriate answer to their question.</p> <p>For the quiz, arrange learners in two equal teams. Ask one learner to keep score using a suitable score-card. Player 1 for Team A asks one of their questions to Player 1 of Team B, who needs to answer the question. Discuss the answer with the group and ask the group to determine if the answer is correct. Player 1 of Team A then confirms the answer they had devised. (You need to correct answers if the learner's answer was not wholly correct.)</p> <p>The scorekeeper records 1 mark for a correct answer under the appropriate team's score column. Play then passes to Player 1 of Team B, who asks their question to Player 1 of Team A, and so on.</p> <p>Total the scores at the end of the quiz to see which team won.</p> <p>After the quiz, collect learners' question/answer cards and check that answers provided were correct. Return any incorrect answers to learners and ask them to change their answer to the correct</p> <p>Demonstrate the materials needed for how to Manipulate audio for Pre-processing. Enable learners to practice using the appropriate materials for how to Perform word formatting in a controlled environment.</p>		

<b>Module 13: 061900926 Use Multimedia processing</b>			
<b>Learning Unit</b>	<b>Suggested Teaching/ Learning Activities</b>	<b>Delivery Context</b>	<b>Media</b>
	Learners must be able to practice and develop their knowledge and skills relating to how to Perform word formatting in an appropriate practical setting. Ensure that learners have the opportunity to ask questions to support their understanding.		

# ARTIFICIAL INTELLIGENCE DATA TECHNICIAN



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Module-14

TRAINER GUIDE

National Vocational Certificate Level 2

Version 1 - November, 2019

Module 14: 061900927 Pre-process data			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<b>LU1: Digitize Manual Data</b>	<p>Deliver an illustrated presentation on how to digitize manual data. Ensure that the presentation focuses on the following:</p> <ul style="list-style-type: none"> <li>- Scan text documents</li> <li>- Scan pictures</li> <li>- Perform OCR using suitable tool(s)</li> <li>- Enter data into text document</li> <li>- Enter data into spreadsheet</li> <li>- Digitize analogue video using suitable device</li> <li>- Digitize analogue audio using suitable device</li> <li>- Arrange audio data using suitable tools</li> <li>- Adjust image orientation to specified requirement using suitable tools</li> <li>- Prepare text based images for OCR(optical character recognition) using suitable tools</li> </ul> <p>Prepare either:</p> <ul style="list-style-type: none"> <li>• A flip chart</li> <li>• A PowerPoint slide</li> <li>• A handout</li> </ul> <p>...showing the key topics about how to digitize manual data. Go through all the key topics briefly and then allocate <b>one key topic</b> to each group.</p> <p>Learners need to work in their small groups discussing the key topic that has been allocated to their group. Each group should use a sheet of flip chart paper to record <b>three</b></p>	Practical Classrooms labs,	Learner Guide Handouts Videos Multi-media projector

Module 14: 061900927 Pre-process data			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
	<p><b>main points</b> from their discussions that relate to <b>their key topic</b>.</p> <p>After the discussion, begin the feedback session. Ask one group to come to the front of the class with their flipchart. Put up the flipchart where it can be easily seen by other learners. Ask the group to share the main points they have recorded for their key topic for how to digitize manual data. Discuss these main points briefly with the whole group. Learners should make additional notes <b>on the flip chart</b> to record additional points their group had not identified.</p> <p>Then ask the next group to share their flipchart showing the main points they have recorded for the next key topic. Repeat the discussion process. Continue until you have covered all the key topics.</p> <p>End the group discussion activity with a summary. Photograph or scan all the flipcharts and use these to create a handout to distribute to all learners.</p> <p>Demonstrate the materials needed for how to digitize manual data. Enable learners to practice using the appropriate materials for how to digitize manual data in a controlled environment.</p> <p>Learners must be able to practice and develop their knowledge and skills relating to how to digitize manual data in an appropriate practical setting. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		

Module 14: 061900927 Pre-process data			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<b>LU2: Prepare Data in required format</b>	<p>Deliver an illustrated presentation on how to Prepare data in required format. Ensure that the presentation focuses on the following</p> <ul style="list-style-type: none"> <li>• Convert video into specified format using suitable tools</li> <li>• Change resolution of the video to the specified requirements using suitable tools</li> <li>• Crop the video to remove unwanted duration using suitable tools</li> <li>• Crop the video to remove unwanted contents using suitable tools</li> <li>• Merge multiple videos using suitable tools</li> <li>• Adjust frame rate of video</li> <li>• Extract frames from video to save them in image format</li> <li>• Modify audio tracks of video using suitable tools</li> <li>• Insert identifier in a video</li> </ul> <p>Prepare either:</p> <ul style="list-style-type: none"> <li>• A flip chart</li> <li>• A PowerPoint slide</li> <li>• A handout</li> </ul>	Practical Classrooms labs,	Learner Guide Handouts Videos Multi-media projector

Module 14: 061900927 Pre-process data			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
	<p>...showing the key topics about how to Prepare data in required format. Go through all the key topics briefly and then allocate <b>one key topic</b> to each group.</p> <p>Learners need to work in their small groups discussing the key topic that has been allocated to their group. Each group should use a sheet of flip chart paper to record <b>three main points</b> from their discussions that relate to <b>their key topic</b>.</p> <p>After the discussion, begin the feedback session. Ask one group to come to the front of the class with their flipchart. Put up the flipchart where it can be easily seen by other learners. Ask the group to share the main points they have recorded for their key topic for how to Prepare data in required format. Discuss these main points briefly with the whole group. Learners should make additional notes <b>on the flip chart</b> to record additional points their group had not identified.</p> <p>Then ask the next group to share their flipchart showing the main points they have recorded for the next key topic. Repeat the discussion process. Continue until you have covered all the key topics.</p> <p>End the group discussion activity with a summary. Photograph or scan all the flipcharts and use these to create a handout to distribute to all learners.</p> <p>Demonstrate the materials needed for how to Prepare data in required format. Enable learners to practice using the appropriate materials for how to Prepare data in</p>		

<b>Module 14: 061900927 Pre-process data</b>			
<b>Learning Unit</b>	<b>Suggested Teaching/ Learning Activities</b>	<b>Delivery Context</b>	<b>Media</b>
	<p>required format in a controlled environment.</p> <p>Learners must be able to practice and develop their knowledge and skills relating to how to Prepare data in required format in an appropriate practical setting. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		

Module 14: 061900927 Pre-process data			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<b>LU3: Label Image Data</b>	<p>Lead a discussion on how to Label image data. Encourage ALL trainees to participate in the discussion. Ensure that the discussion addresses the following points:</p> <ul style="list-style-type: none"> <li>- Convert audio into specified format using suitable tools</li> <li>- Adjust bit rate of audio using suitable tools</li> <li>- Reduce noise from audio using suitable tools</li> <li>- Enhance audio for preprocessing</li> </ul> <p>Learners need to devise 10 quiz questions with answers based on how to Label image data. They must make sure their questions cover key topics for how to Perform word formatting.</p> <p>Issue each learner with 10 blank cards. Each learner should number the cards and write their name on one side with a question about how to Label image data. On the reverse of the card, they should write an appropriate answer to their question.</p> <p>For the quiz, arrange learners in two equal teams. Ask one learner to keep score using a suitable score-card. Player 1 for Team A asks one of their questions to Player 1 of Team B, who needs to answer the question. Discuss the answer with the group and ask the group to determine if the answer is correct. Player 1 of Team A then confirms the answer they had devised. (You need to correct answers if the learner's answer was not wholly correct.)</p> <p>The scorekeeper records 1 mark for a correct answer under the appropriate team's score column. Play then passes to Player 1 of Team B, who asks their question to Player 1 of Team A, and so on.</p> <p>Total the scores at the end of the quiz to see which team won.</p> <p>After the quiz, collect learners' question/answer cards and check that answers provided were correct. Return any</p>	Practical Classrooms	labs, Learner Guide Handouts Videos Multi-media projector

Module 14: 061900927 Pre-process data			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<b>LU4: Label Audio Data</b>	<p>Deliver an illustrated presentation on how to label audio data. Ensure that the presentation focuses on the following:</p> <ol style="list-style-type: none"> <li>1. Apply Timestamp to transcript</li> <li>2. Label audio data with text as per requirements</li> <li>3. Label audio data with noise as per requirement</li> </ol> <p>Prepare either:</p> <ul style="list-style-type: none"> <li>• A flip chart</li> <li>• A PowerPoint slide</li> <li>• A handout</li> </ul> <p>...showing the key topics about how to label audio data. Go through all the key topics briefly and then allocate <b>one key topic</b> to each group.</p> <p>Learners need to work in their small groups discussing the key topic that has been allocated to their group. Each group should use a sheet of flip chart paper to record <b>three main points</b> from their discussions that relate to <b>their key topic</b>.</p> <p>After the discussion, begin the feedback session. Ask one group to come to the front of the class with their flipchart. Put up the flipchart where it can be easily seen by other learners. Ask the group to share the main points they have recorded for their key topic for how to label audio data. Discuss these main points briefly with the whole group. Learners should make additional notes <b>on the flip chart</b> to record additional points their group had not identified.</p> <p>Then ask the next group to share their flipchart showing the main points they have recorded for the next key topic. Repeat the discussion process. Continue until you have covered all the key topics.</p>		

Module 14: 061900927 Pre-process data			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<b>LU5: Label Text Data</b>	<p>Lead a discussion on how to label text data. Encourage ALL trainees to participate in the discussion. Ensure that the discussion addresses the following points:</p> <ol style="list-style-type: none"> <li>1. Annotate text data based on desired features</li> <li>2. Annotate text data word by word for identification (Name, City etc.)</li> <li>3. Annotate text data word by word for classification</li> </ol> <p>Learners need to devise 10 quiz questions with answers based on how to label text data. They must make sure their questions cover key topics for how to label text data.</p> <p>Issue each learner with 10 blank cards. Each learner should number the cards and write their name on one side with a question about how to label text data. On the reverse of the card, they should write an appropriate answer to their question.</p> <p>For the quiz, arrange learners in two equal teams. Ask one learner to keep score using a suitable score-card. Player 1 for Team A asks one of their questions to Player 1 of Team B, who needs to answer the question. Discuss the answer with the group and ask the group to determine if the answer is correct. Player 1 of Team A then confirms the answer they had devised. (You need to correct answers if the learner's answer was not wholly correct.)</p> <p>The scorekeeper records 1 mark for a correct answer under the appropriate team's score column. Play then passes to Player 1 of Team B, who asks their question to Player 1 of Team A, and so on.</p> <p>Total the scores at the end of the quiz to see which team won.</p> <p>After the quiz, collect learners' question/answer cards and check that answers provided were correct. Return any</p>	<p>Practical Classrooms</p> <p>labs,</p>	<p>Learner Guide Handouts Videos Multi-media projector</p>

Module 14: 061900927 Pre-process data			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<b>LU6: Label Video Data</b>	<p>Lead a brainstorm on how to label video data. List the brainstorm ideas on a flipchart. If necessary, prompt learners to consider the following:</p> <ul style="list-style-type: none"> <li>- Apply Timestamp</li> <li>- Label video data with text as per requirements</li> <li>- Label video data with specified noise</li> <li>- Annotate image frames by text labels</li> <li>- Annotate image frames by bounding box</li> <li>- Type text contained in video</li> <li>- Prepare a short case study giving background information of the artificial intelligence expert. The information should include:           <ul style="list-style-type: none"> <li>• The artificial intelligence expert's name</li> <li>• Address of the artificial intelligence expert's organisation</li> <li>• How long the artificial intelligence expert has been practising for</li> <li>• How many staff are employed by the organisation.</li> </ul> </li> </ul> <p>Discuss the topic of how to label video data with the invited artificial intelligence expert. The artificial intelligence expert needs to prepare a short introduction about their organisation they can deliver to the learners at the beginning of their presentation. Ask the artificial intelligence expert to bring with him/her materials that will support the presentation, for example relevant resources, photographs, records.</p> <p>A week before the presentation, provide learners with a copy of the case study you have prepared describing the artificial intelligence expert's organisation. Hold a discussion with the learners on the key points of how to</p>	Practical Classrooms	labs, Learner Guide Handouts Videos Multi-media projector

# ARTIFICIAL INTELLIGENCE DATA TECHNICIAN



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Module-15

TRAINER GUIDE

National Vocational Certificate Level 2

Version 1 - November, 2019

<b>Module 15: Perform Basic Computer Application</b>			
<b>Learning Unit</b>	<b>Suggested Teaching/ Learning Activities</b>	<b>Delivery Context</b>	<b>Media</b>
LU1:			
LU2:			
LU3:			
LU4:			

## Frequently Asked Questions

1. What is Competency Based Training (CBT) and how is it different from currently offered trainings in institutes?	Competency-based training (CBT) is an approach to vocational education and training that places emphasis on what a person can do in the workplace as a result of completing a program of training. Compared to conventional programs, the competency based training is not primarily content based; it rather focuses on the competence requirement of the envisaged job role. The whole qualification refers to certain industry standard criterion and is modularized in nature rather than being course oriented.
2. What is the passing criterion for CBT certificate?	You shall be required to be declared "Competent" in the summative assessment to attain the certificate.
3. What are the entry requirements for this course?	The entry requirement for this course is 8th Grade or equivalent.
4. How can I progress in my educational career after attaining this certificate?	You shall be eligible to take admission in the National Vocational Certificate Level-3 in Artificial Intelligence Data Technician. You shall be able to progress further to National Vocational Certificate Level-4 in Artificial Intelligence Data Technician (Supervisor); and take admission in a level-5, DAE or equivalent course. In certain case, you may be required to attain an equivalence certificate from The Inter Board Committee of Chairmen (IBCC).
5. If I have the experience and skills mentioned in the competency standards, do I still need to attend the course to attain this certificate?	You can opt to take part in the Recognition of Prior Learning (RPL) program by contacting the relevant training institute and getting assessed by providing the required evidences.
6. What is the entry requirement for Recognition of Prior Learning program (RPL)?	There is no general entry requirement. The institute shall assess you, identify your competence gaps and offer you courses to cover the gaps; after which you can take up the final assessment.

7. Is there any age restriction for entry in this course or Recognition of Prior Learning program (RPL)?	There are no age restrictions to enter this course or take up the Recognition of Prior Learning program
8. What is the duration of this course?	The duration of the course work is 3220 hours
9. What are the class timings?	The classes are normally offered 25 days a month from 08:00am to 01:30pm. These may vary according to the practices of certain institutes.
10. What is equivalence of this certificate with other qualifications?	As per the national vocational qualifications framework, the level-4 certificate is equivalent to Matriculation. The criteria for equivalence and equivalence certificate can be obtained from The Inter Board Committee of Chairmen (IBCC).
11. What is the importance of this certificate in National and International job market?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTC). These standards are also recognized worldwide as all the standards are coded using international methodology and are accessible to the employers worldwide through NAVTTC website.
12. Which jobs can I get after attaining this certificate? Are there job for this certificate in public sector as well?	You shall be able to take up jobs in the artificial intelligence industry which comprises of development of applications for play store as well as testing and optimization of the apps.
13. What are possible career progressions in industry after attaining this certificate?	You shall be able to progress up to the level of supervisor after attaining sufficient experience, knowledge and skills during the job. Attaining additional relevant qualifications may aid your career advancement to even higher levels.
14. Is this certificate recognized by any competent authority in Pakistan?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTC). The official certificates shall be awarded by the relevant certificate awarding body.

15. Is on-the-job training mandatory for this certificate? If yes, what is the duration of on-the-job training?	On-the-job training is not a requirement for final / summative assessment of this certificate. However, taking up on-the-job training after or during the course work may add your chances to get a job afterwards.
16. How much salary can I get on job after attaining this certificate?	The minimum wages announced by the Government of Pakistan in 2019 are PKR 17,500. This may vary in subsequent years and different regions of the country. Progressive employers may pay more than the mentioned amount.
17. Are there any alternative certificates which I can take up?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
18. What is the teaching language of this course?	The teaching language of this course is Urdu and English.
19. Is it possible to switch to other certificate programs during the course?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
20. What is the examination / assessment system in this program?	Competency based assessments are organized by training institutes during the course which serve the purpose of assessing the progress and preparedness of each student. Final / summative assessments are organized by the relevant qualification awarding bodies at the end of the certificate program. You shall be required to be declared "Competent" in the summative assessment to attain the certificate.
21. Does this certificate enable me to work as freelancer?	You can start your small business/ software house related to artificial intelligence and you can work as freelancer as well after the completion of the course. You may need additional skills on entrepreneurship to support your initiative.

## Test Yourself (Multiple Choice Questions)

### MODULE Use of Spreadsheet

- Question 1** Which one of the following options is used to cut the text in spreadsheet
- A Ctrl+x
  - B Ctrl+v
  - C Ctrl+w
  - D Ctrl+s
- Question 2** Which function tells how many numeric entries there in a cell are?
- A Num
  - B Count
  - C Sum
  - D Chknum

**Question 3** The process of arranging the items of a column in some sequence or order is known as:

- A Arranging
- B Auto Filling
- C Sorting
- D Filtering

**Question 4** How can you remove borders applied in a cell?

- A Choose None on Border tab of Format cells
- B Open the list on Border tool in Formatting toolbar then choose first tool (no border)
- C Both of above
- D None of above

**Question 5** Which of the following commands will you use to convert the column of data into row?

- A Cut and Paste
- B Edit >> Paste Special >> Transpose
- C Both of above
- D None of above

**MODULE Use Multimedia Processing**

**Question 6** Joint Photographic Experts Group (JPEG) is used to compress

- A Music
- B Pictures
- C Images
- D Frames

- Question 7** If frames are displayed on screen fast enough, we get an impression of
- A Signals
  - B Motions
  - C Packets
  - D Bits
- Question 8** Moving Picture Experts Group (MPEG) is used to compress
- A Images
  - B Audio
  - C Video
  - D Images

- Question 9** In Audio and Video Compression, each frame is divided into small grids, called picture elements or
- A Frame
  - B Packets
  - C Pixels
  - D Mega Pixels

- Question 10** A video consists of a sequence of
- A Frames
  - B Signals
  - C Packets
  - D Slots

**MODULE****Pre-Process Data**

- Question 11** What does OCR do?
- A Change an video file to audio
  - B Extract text from an Image
  - C Combine Images into a slideshow
  - D Check for grammatical mistakes in text
- Question 12** Which one of the following is not an image file format
- A JPEG
  - B JPG
  - C PNG
  - D RAR

**Question 13** Why is noise added to an audio file

- A To cancel out the noise already present
- B To improve the sound variation
- C To increase the file size
- D To act as markers in the audio file

**Question 14** What is a frame ?

- A Another name for a bounding box
- B An extension for image files
- C One of the many still images that compose the complete video
- D The point in an audio file where noise is inserted

**Question 15** What does the term “*timestamp*” mean?

- A A analogue record of the time of occurrence of a particular event.
- B Filmmaking.
- C A digital record of the time of occurrence of a particular event.
- D Time recording.

## Answers

### MODULE Use of Spreadsheet

- |                   |   |                                      |
|-------------------|---|--------------------------------------|
| <b>Question 1</b> | Which one of the following options is used to cut the text in spreadsheet             | A Ctrl+x                             |
| <b>Question 2</b> | Which function tells how many numeric entries there in a cell are?                    | B Count                              |
| <b>Question 3</b> | The process of arranging the items of a column in some sequence or order is known as: | C Sorting                            |
| <b>Question 4</b> | How can you remove borders applied in a cell?   | C Both of above                      |
| <b>Question 5</b> | Which of the following commands will you use to convert the column of data into row?  | B Edit >> Paste Special >> Transpose |

MODULE	Use Multimedia Processing	
Question 1	Joint Photographic Experts Group (JPEG) is used to compress	B Pictures
Question 2	If frames are displayed on screen fast enough, we get an impression of consists of four _____ separated by dots (.).	B Motions
Question 3	Moving Picture Experts Group (MPEG) is used to compress	D Images
Question 4	In Audio and Video Compression, each frame is divided into small grids, called picture elements or	C Pixels
Question 5	A video consists of a sequence of	A Frames

**MODULE**    Pre-Process Data

- |                 |          |  |          |   |
|-----------------|----------|--|----------|---|
| <b>Question</b> | <b>1</b> | What does OCR do?                              | <b>B</b> | Extract text from an Image  |
| <b>Question</b> | <b>2</b> | What does OCR do?                              | <b>D</b> | RAR   |
| <b>Question</b> | <b>3</b> | Why is noise added to an audio file            | <b>D</b> | Extract text from an Image  |
| <b>Question</b> | <b>4</b> | What is a frame ?                              | <b>C</b> | RAR   |
| <b>Question</b> | <b>5</b> | What does the term “ <i>timestamp</i> ” mean ? | <b>C</b> | A digital record of the time of occurrence of a particular event. |

