

## AI-102

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## AI-102

**Designing and Implementing a Microsoft Azure AI Solution (beta)**



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## Plan and Manage an Azure Cognitive Services Solution

### Question Set 1

#### QUESTION 1

You need to build a chatbot that meets the following requirements:

- Supports chit-chat, knowledge base, and multilingual models
- Performs sentiment analysis on user messages
- Selects the best language model automatically

What should you integrate into the chatbot?

- A. QnA Maker, Language Understanding, and Dispatch
- B. Translator, Speech, and Dispatch
- C. Language Understanding, Text Analytics, and QnA Maker
- D. Text Analytics, Translator, and Dispatch

**Correct Answer: C**

**Section: (none)**

**Explanation**

#### **Explanation/Reference:**

Explanation:

Language Understanding: An AI service that allows users to interact with your applications, bots, and IoT devices by using natural language.

QnA Maker is a cloud-based Natural Language Processing (NLP) service that allows you to create a natural conversational layer over your data. It is used to find the most appropriate answer for any input from your custom knowledge base (KB) of information.

Text Analytics: Mine insights in unstructured text using natural language processing (NLP)—no machine learning expertise required. Gain a deeper understanding of customer opinions with sentiment analysis. The Language Detection feature of the Azure Text Analytics REST API evaluates text input

Incorrect Answers:

A, B, D: Dispatch uses sample utterances for each of your bot's different tasks (LUIS, QnA Maker, or custom), and builds a model that can be used to properly route your user's request to the right task, even across multiple bots.

Reference:

<https://azure.microsoft.com/en-us/services/cognitive-services/text-analytics/>

<https://docs.microsoft.com/en-us/azure/cognitive-services/qnamaker/overview/overview>

## QUESTION 2

Your company wants to reduce how long it takes for employees to log receipts in expense reports. All the receipts are in English.

You need to extract top-level information from the receipts, such as the vendor and the transaction total. The solution must minimize development effort.

Which Azure Cognitive Services service should you use?

- A. Custom Vision
- B. Personalizer
- C. Form Recognizer
- D. Computer Vision

**Correct Answer:** C

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Explanation:

Azure Form Recognizer is a cognitive service that lets you build automated data processing software using machine learning technology. Identify and extract text, key/value pairs, selection marks, tables, and structure from your documents—the service outputs structured data that includes the relationships in the original file, bounding boxes, confidence and more.

Form Recognizer is composed of custom document processing models, prebuilt models for invoices, receipts, IDs and business cards, and the layout model.

Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/form-recognizer>

## QUESTION 3

HOTSPOT

You need to create a new resource that will be used to perform sentiment analysis and optical character recognition (OCR). The solution must meet the following requirements:

- Use a single key and endpoint to access multiple services.
- Consolidate billing for future services that you might use.
- Support the use of Computer Vision in the future.

How should you complete the HTTP request to create the new resource? To answer, select the appropriate options in the answer area.

**NOTE:** Each correct selection is worth one point.

Hot Area:

Answer Area

	▼	https://management.azure.com/subscriptions/xxxxxxx-xxxx-
PATCH		
POST		
PUT		

xxxx-xxxx-  
xxxxxxxxxxxx/resourceGroups/RG1/providers/Microsoft.CognitiveServices/  
accounts/CS1?api-version=2017-04-18

```
{  
  "location": "West US",  
  "kind": " ",  
  "sku": {  
    "name": "S0"  
  },  
  "properties": {},  
  "identity": {  
    "type": "SystemAssigned"  
  }  
}
```

Correct Answer:

### Answer Area

▼	https://management.azure.com/subscriptions/xxxxxxx-xxxx-
PATCH	
POST	
PUT	

xxxx-xxxx-  
xxxxxxxxxxxx/resourceGroups/RG1/providers/Microsoft.CognitiveServices/  
accounts/CS1?api-version=2017-04-18

```
{  
  "location": "West US",  
  "kind": "▼",  
    CognitiveServices  
    ComputerVision  
    TextAnalytics  
  "sku": {  
    "name": "S0"  
  },  
  "properties": {},  
  "identity": {  
    "type": "SystemAssigned"  
  }  
}
```

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

Box 1: PUT

Sample Request: PUT https://management.azure.com/subscriptions/00000000-0000-0000-0000-000000000000/resourceGroups/test-rg/providers/Microsoft.DeviceUpdate/accounts/contoso?api-version=2020-03-01-preview

Incorrect Answers:

PATCH is for updates.

Box 2: CognitiveServices

Microsoft Azure Cognitive Services provide us to use its pre-trained models for various Business Problems related to Machine Learning.

List of Different Services are:

- Decision

- Language (includes sentiment analysis)
- Speech
- Vision (includes OCR)
- Web Search

Reference:

<https://docs.microsoft.com/en-us/rest/api/deviceupdate/resource-manager/accounts/create>

<https://www.analyticsvidhya.com/blog/2020/12/microsoft-azure-cognitive-services-api-for-ai-development/>

#### QUESTION 4

You are developing a new sales system that will process the video and text from a public-facing website.

You plan to monitor the sales system to ensure that it provides equitable results regardless of the user's location or background.

Which two responsible AI principles provide guidance to meet the monitoring requirements? Each correct answer presents part of the solution. (Choose two.)

**NOTE:** Each correct selection is worth one point.

- A. transparency
- B. fairness
- C. inclusiveness
- D. reliability and safety
- E. privacy and security

**Correct Answer:** BD

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Explanation:

AI systems should treat all people fairly.

AI systems should perform reliably and safely.

Reference:

<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/strategy/responsible-ai>

#### QUESTION 5

DRAG DROP

You plan to use containerized versions of the Anomaly Detector API on local devices for testing and in on-premises datacenters.

You need to ensure that the containerized deployments meet the following requirements:

- Prevent billing and API information from being stored in the command-line histories of the devices that run the container.
- Control access to the container images by using Azure role-based access control (Azure RBAC).

Which four actions should you perform in sequence? To answer, move the appropriate actions from the list of actions to the answer area and arrange them in the correct order. (Choose four.)

**NOTE:** More than one order of answer choices is correct. You will receive credit for any of the correct orders you select.

**Select and Place:**

Actions	Answer Area
Create a custom Dockerfile.	
Pull the Anomaly Detector container image.	
Distribute a <code>docker run</code> script.	
Push the image to an Azure container registry.	
Build the image.	
Push the image to Docker Hub.	

**Correct Answer:**

Actions	Answer Area
Create a custom Dockerfile.	Pull the Anomaly Detector container image.
Pull the Anomaly Detector container image.	Create a custom Dockerfile.
Distribute a <code>docker run</code> script.	Push the image to an Azure container registry.
Push the image to an Azure container registry.	Distribute a <code>docker run</code> script.
Build the image.	
Push the image to Docker Hub.	

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

Step 1: Pull the Anomaly Detector container image.

Step 2: Create a custom Dockerfile

Step 3: Push the image to an Azure container registry.

To push an image to an Azure Container registry, you must first have an image.

Step 4: Distribute the docker run script

Use the docker run command to run the containers.

Reference:

<https://docs.microsoft.com/en-us/azure/container-registry/container-registry-intro>

## QUESTION 6

### HOTSPOT

You plan to deploy a containerized version of an Azure Cognitive Services service that will be used for text analysis.

You configure `https://contoso.cognitiveservices.azure.com` as the endpoint URI for the service, and you pull the latest version of the Text Analytics Sentiment Analysis container.

You need to run the container on an Azure virtual machine by using Docker.

How should you complete the command? To answer, select the appropriate options in the answer area.

**NOTE:** Each correct selection is worth one point.

**Hot Area:**

#### Answer Area

```
docker run --rm -it -p 5000:5000 --memory 8g --cpus 1 \
```

<input type="text"/>	▼ \
http://contoso.blob.core.windows.net	
https://contoso.cognitiveservices.azure.com	
mcr.microsoft.com/azure-cognitive-services/textanalytics/keyphrase	
mcr.microsoft.com/azure-cognitive-services/textanalytics/sentiment	

```
Eula=accept \
```

Billing=	▼ \
http://contoso.blob.core.windows.net	
https://contoso.cognitiveservices.azure.com	
mcr.microsoft.com/azure-cognitive-services/textanalytics/keyphrase	
mcr.microsoft.com/azure-cognitive-services/textanalytics/sentiment	

```
ApiKey=xxxxxxxxxxxxxxxxxxxx
```

**Correct Answer:**



#### Answer Area

```
docker run --rm -it -p 5000:5000 --memory 8g --cpus 1 \
```

http://contoso.blob.core.windows.net
https://contoso.cognitiveservices.azure.com
mcr.microsoft.com/azure-cognitive-services/textanalytics/keyphrase
mcr.microsoft.com/azure-cognitive-services/textanalytics/sentiment

```
Eula=accept \
```

```
Billing=
```

http://contoso.blob.core.windows.net
https://contoso.cognitiveservices.azure.com
mcr.microsoft.com/azure-cognitive-services/textanalytics/keyphrase
mcr.microsoft.com/azure-cognitive-services/textanalytics/sentiment

```
ApiKey=xxxxxxxxxxxxxxxxxxxx
```

#### Section: (none)

#### Explanation

#### Explanation/Reference:

Explanation:

Box 1: mcr.microsoft.com/azure-cognitive-services/textanalytics/sentiment

To run the Sentiment Analysis v3 container, execute the following docker run command.

```
docker run --rm -it -p 5000:5000 --memory 8g --cpus 1 \
```

```
mcr.microsoft.com/azure-cognitive-services/textanalytics/sentiment \
```

```
Eula=accept \
```

```
Billing={ENDPOINT_URI} \
```

ApiKey={API\_KEY} is the endpoint for accessing the Text Analytics API. https://<your-custom-subdomain>.cognitiveservices.azure.com

Box 2: https://contoso.cognitiveservices.azure.com

{ENDPOINT\_URI} is the endpoint for accessing the Text Analytics API: https://<your-custom-subdomain>.cognitiveservices.a The endpoint for accessing the Text Analytics API. zure.com

Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/text-analytics/how-tos/text-analytics-how-to-install-containers?tabs=sentiment>

#### QUESTION 7

You have the following C# method for creating Azure Cognitive Services resources programmatically.

```
static void create_resource(CognitiveServicesManagementClient client, string
resource_name, string kind, string account_tier, string location)
{
    CognitiveServicesAccount parameters =
        new CognitiveServicesAccount(null, null, kind, location, resource_name,
new CognitiveServicesAccountProperties(), new Sku(account_tier));
    var result = client.Accounts.Create(resource_group_name, account_tier,
parameters);
}
```

You need to call the method to create a free Azure resource in the West US Azure region. The resource will be used to generate captions of images automatically.

Which code should you use?

- A. create\_resource(client, "res1", "ComputerVision", "F0", "westus")
- B. create\_resource(client, "res1", "CustomVision.Prediction", "F0", "westus")
- C. create\_resource(client, "res1", "ComputerVision", "S0", "westus")
- D. create\_resource(client, "res1", "CustomVision.Prediction", "S0", "westus")

**Correct Answer: B**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

Many of the Cognitive Services have a free tier you can use to try the service. To use the free tier, use F0 as the SKU for your resource.

There are two tiers of keys for the Custom Vision service. You can sign up for a F0 (free) or S0 (standard) subscription through the Azure portal.

Incorrect Answers:

A: There is no free tier (F0) for ComputerVision.

Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/cognitive-services-apis-create-account-client-library?pivots=programming-language-csharp>

<https://docs.microsoft.com/en-us/azure/cognitive-services/custom-vision-service/limits-and-quotas>

## QUESTION 8

You successfully run the following HTTP request.

```
POST https://management.azure.com/subscriptions/18c51a87-3a69-47a8-aedc-a54745f708a1/resourceGroups/RG1/providers/
Microsoft.CognitiveServices/accounts/contosol/regenerateKey?api-version=2017-04-18
Body{"keyName": "Key2"}
```

What is the result of the request?

- A. A key for Azure Cognitive Services was generated in Azure Key Vault.
- B. A new query key was generated.
- C. The primary subscription key and the secondary subscription key were rotated.
- D. The secondary subscription key was reset.

**Correct Answer:** B

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Explanation:

Accounts - Regenerate Key regenerates the specified account key for the specified Cognitive Services account.

Syntax:

POST <https://management.azure.com/subscriptions/{subscriptionId}/resourceGroups/{resourceGroupName}/providers/Microsoft.CognitiveServices/accounts/{accountName}/regenerateKey?api-version=2017-04-18>

Reference:

<https://docs.microsoft.com/en-us/rest/api/cognitiveservices/accountmanagement/accounts/regeneratekey>

## Plan and Manage an Azure Cognitive Services Solution

### Testlet 2

#### Case study

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

#### To start the case study

To display the first question in this case study, click the **Next** button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an **All Information** tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the **Question** button to return to the question.

#### Overview

##### Existing Environment

A company named Wide World Importers is developing an e-commerce platform.

You are working with a solutions architect to design and implement the features of the e-commerce platform. The platform will use microservices and a serverless environment built on Azure.

Wide World Importers has a customer base that includes English, Spanish, and Portuguese speakers.

##### Applications

Wide World Importers has an App Service plan that contains the web apps shown in the following table.

Name	Description
Product Management	An app used by employees to create and manage products. The app and the expected inputs from the employees are in English.
Inventory Tracking	An app used by employees to manage inventory when dispatching orders, receiving refunds, and receiving consignments from suppliers.

## Azure Resources

You have the following resources:

- An Azure Active Directory (Azure AD) tenant
  - The tenant supports internal authentication.
  - All employees belong to a group named AllUsers.
  - Senior managers belong to a group named LeadershipTeam.
- An Azure Functions resource
  - A function app posts to Azure Event Grid when stock levels of a product change between OK, Low Stock, and Out of Stock. The function app uses the Azure Cosmos DB change feed.
- An Azure Cosmos DB account
  - The account uses the Core (SQL) API.
  - The account stores data for the Product Management app and the Inventory Tracking app.
- An Azure Storage account
  - The account contains blob containers for assets related to products.
  - The assets include images, videos, and PDFs.
- An Azure Cognitive Services resource named wwics
- A Video Indexer resource named wwivi

## Requirements

### Business Goals

Wide World Importers wants to leverage AI technologies to differentiate itself from its competitors.

### Planned Changes

Wide World Importers plans to start the following projects:

- A product creation project: Help employees create accessible and multilingual product entries, while expediting product entry creation.
- A smart e-commerce project: Implement an Azure Cognitive Search solution to display products for customers to browse.
- A shopping on-the-go project: Build a chatbot that can be integrated into smart speakers to support customers.

## Business Requirements

Wide World Importers identifies the following business requirements for all the projects:

- Provide a multilingual customer experience that supports English, Spanish, and Portuguese.
- Whenever possible, scale based on transaction volumes to ensure consistent performance.
- Minimize costs.

### **Governance and Security Requirements**

Wide World Importers identifies the following governance and security requirements:

- Data storage and processing must occur in datacenters located in the United States.
- Azure Cognitive Services must be inaccessible directly from the internet.

### **Accessibility Requirements**

Wide World Importers identifies the following accessibility requirements:

- All images must have relevant alt text.
- All videos must have transcripts that are associated to the video and included in product descriptions.
- Product descriptions, transcripts, and all text must be available in English, Spanish, and Portuguese.

### **Product Creation Requirements**

Wide World Importers identifies the following requirements for improving the Product Management app:

- Minimize how long it takes for employees to create products and add assets.
- Remove the need for manual translations.

### **Smart E-Commerce Requirements**

Wide World Importers identifies the following requirements for the smart e-commerce project:

- Ensure that the Cognitive Search solution meets a Service Level Agreement (SLA) of 99.9% availability for searches and index writes.
- Provide users with the ability to search insight gained from the images, manuals, and videos associated with the products.
- Support autocompletion and autosuggestion based on all product name variants.
- Store all raw insight data that was generated, so the data can be processed later.
- Update the stock level field in the product index immediately upon changes.
- Update the product index hourly.

### **Shopping On-the-Go Requirements**

Wide World Importers identifies the following requirements for the shopping on-the-go chatbot:

- Answer common questions.
- Support interactions in English, Spanish, and Portuguese.
- Replace an existing FAQ process so that all Q&A is managed from a central location.
- Provide all employees with the ability to edit Q&As. Only senior managers must be able to publish updates.
- Support purchases by providing information about relevant products to customers. Product displays must include images and warnings when stock levels are low or out of stock.

### Product JSON Sample

You have the following JSON sample for a product.

```
{
  "sku": "b1",
  "name": {
    "en": "Bicycle",
    "es": "Bicicleta",
    "pt": "Bicicleta"
  },
  "stocklevel": "Out of Stock",
  "description": {
    "en": "Bicycle",
    "es": "Bicicleta",
    "pt": "Bicicleta"
  },
  "image": {
    "uri": "https://upload.worldwideimporters.org/bicycle.jpg",
    "alttext": {
      "en": "Bicycle",
      "es": "Bicicleta",
      "pt": "Bicicleta"
    }
  },
  "createdUtc": "2020-02-14T06:08:39Z",
  "language": "en"
}
```

### QUESTION 1

DRAG DROP

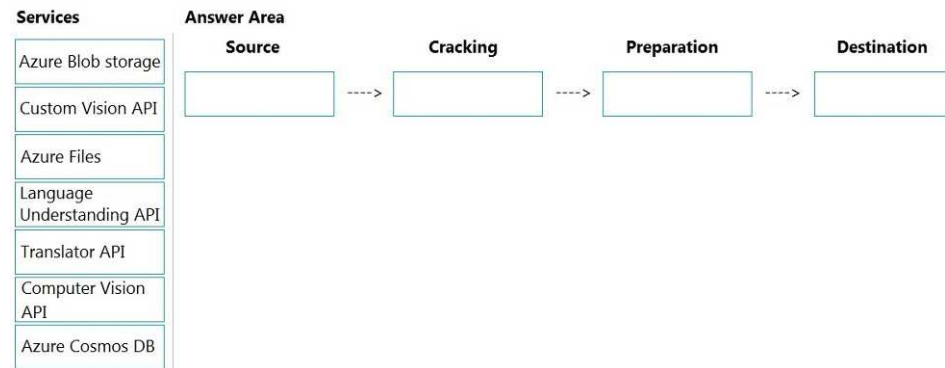
You are developing the smart e-commerce project.

You need to design the skillset to include the contents of PDFs in searches.

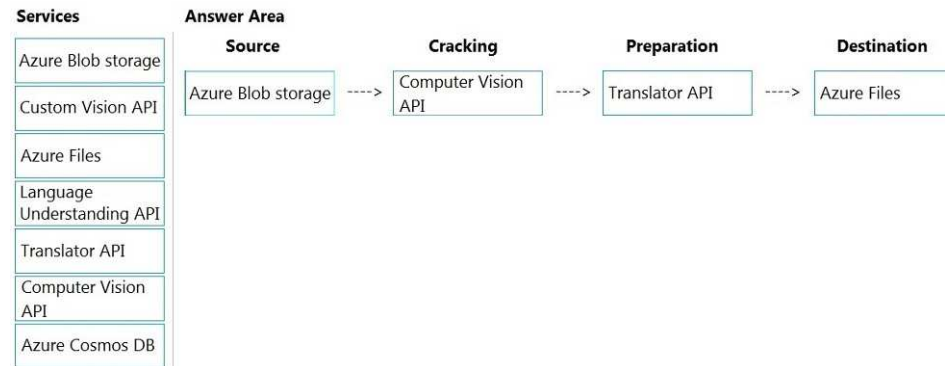
How should you complete the skillset design diagram? To answer, drag the appropriate services to the correct stages. Each service may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

**NOTE:** Each correct selection is worth one point.

**Select and Place:**



**Correct Answer:**



**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:



Box 1: Azure Blob storage

At the start of the pipeline, you have unstructured text or non-text content (such as images, scanned documents, or JPEG files). Data must exist in an Azure data storage service that can be accessed by an indexer.

Box 2: Computer Vision API

Scenario: Provide users with the ability to search insight gained from the images, manuals, and videos associated with the products.

The Computer Vision Read API is Azure's latest OCR technology (learn what's new) that extracts printed text (in several languages), handwritten text (English only), digits, and currency symbols from images and multi-page PDF documents.

Box 3: Translator API

Scenario: Product descriptions, transcripts, and all text must be available in English, Spanish, and Portuguese.

Box 4: Azure Files

Scenario: Store all raw insight data that was generated, so the data can be processed later.

Incorrect Answers:

The custom vision API from Microsoft Azure learns to recognize specific content in imagery and becomes smarter with training and time.

Reference:

<https://docs.microsoft.com/en-us/azure/search/cognitive-search-concept-intro>

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/overview-ocr>

## Implement Computer Vision Solutions

### Question Set 1

#### QUESTION 1

You have a Video Indexer service that is used to provide a search interface over company videos on your company's website.

You need to be able to search for videos based on who is present in the video.

What should you do?

- A. Create a person model and associate the model to the videos.
- B. Create person objects and provide face images for each object.
- C. Invite the entire staff of the company to Video Indexer.
- D. Edit the faces in the videos.
- E. Upload names to a language model.

**Correct Answer:** A

**Section:** (none)

**Explanation**

#### **Explanation/Reference:**

Explanation:

Video Indexer supports multiple Person models per account. Once a model is created, you can use it by providing the model ID of a specific Person model when uploading/indexing or reindexing a video. Training a new face for a video updates the specific custom model that the video was associated with.

Note: Video Indexer supports face detection and celebrity recognition for video content. The celebrity recognition feature covers about one million faces based on commonly requested data source such as IMDB, Wikipedia, and top LinkedIn influencers. Faces that aren't recognized by the celebrity recognition feature are detected but left unnamed. Once you label a face with a name, the face and name get added to your account's Person model. Video Indexer will then recognize this face in your future videos and past videos.

Reference:

<https://docs.microsoft.com/en-us/azure/media-services/video-indexer/customize-person-model-with-api>

#### QUESTION 2

You use the Custom Vision service to build a classifier.

After training is complete, you need to evaluate the classifier.

Which two metrics are available for review? Each correct answer presents a complete solution. (Choose two.)

**NOTE:** Each correct selection is worth one point.

- A. recall
- B. F-score
- C. weighted accuracy
- D. precision
- E. area under the curve (AUC)

**Correct Answer:** AD

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Explanation:

Custom Vision provides three metrics regarding the performance of your model: precision, recall, and AP.

Reference:

<https://www.tallan.com/blog/2020/05/19/azure-custom-vision/>

### QUESTION 3

DRAG DROP

You are developing a call to the Face API. The call must find similar faces from an existing list named employeefaces. The employeefaces list contains 60,000 images.

How should you complete the body of the HTTP request? To answer, drag the appropriate values to the correct targets. Each value may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

**NOTE:** Each correct selection is worth one point.

**Select and Place:**

**Values**

"faceListId"
"LargeFaceListId"
"matchFace"
"matchPerson"

**Answer Area**

```
{  
  "faceId": "18c51a87-3a69-47a8-aedc-a54745f708a1",  
  [ ]: "employeefaces",  
  "maxNumOfCandidatesReturned": 1,  
  "mode": [ ]  
}
```

**Correct Answer:**

<https://www.gratisexam.com/>

**Values**

"faceListId"  
"LargeFaceListId"  
"matchFace"  
"matchPerson"

**Answer Area**

```
{  
  "faceId": "18c51a87-3a69-47a8-aedc-a54745f708a1",  
  "LargeFaceListId": "employeefaces",  
  "maxNumOfCandidatesReturned": 1,  
  "mode": "matchFace"  
}
```

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

Box 1: LargeFaceListID

LargeFaceList: Add a face to a specified large face list, up to 1,000,000 faces.

Note: Given query face's faceId, to search the similar-looking faces from a faceId array, a face list or a large face list. A "faceListId" is created by FaceList - Create containing persistedFaceIds that will not expire. And a "largeFaceListId" is created by LargeFaceList - Create containing persistedFaceIds that will also not expire.

Incorrect Answers:

Not "faceListId": Add a face to a specified face list, up to 1,000 faces.

Box 2: matchFace

Find similar has two working modes, "matchPerson" and "matchFace". "matchPerson" is the default mode that it tries to find faces of the same person as possible by using internal same-person thresholds. It is useful to find a known person's other photos. Note that an empty list will be returned if no faces pass the internal thresholds. "matchFace" mode ignores same-person thresholds and returns ranked similar faces anyway, even the similarity is low. It can be used in the cases like searching celebrity-looking faces.

Reference:

<https://docs.microsoft.com/en-us/rest/api/faceapi/face/findsimilar>

**QUESTION 4**

**DRAG DROP**

You are developing a photo application that will find photos of a person based on a sample image by using the Face API.

You need to create a POST request to find the photos.

How should you complete the request? To answer, drag the appropriate values to the correct targets. Each value may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

**NOTE:** Each correct selection is worth one point.

**Select and Place:**

**Values**

detect  
findsimilars  
group  
identify  
matchFace  
matchPerson  
verify

**Answer Area**

POST {Endpoint}/face/v1.0/   
Request Body

```
{  
  "faceId": "c5c24a82-6845-4031-9d5d-978df9175426",  
  "largeFaceListId": "sample_list",  
  "largeFaceListId": "sample_list",  
  "maxNumOfCandidatesReturned": 10,  
  "mode": "   
}
```

**Correct Answer:**

**Values**

detect  
findsimilars  
group  
identify  
matchFace  
matchPerson  
verify

**Answer Area**

POST {Endpoint}/face/v1.0/   
Request Body

```
{  
  "faceId": "c5c24a82-6845-4031-9d5d-978df9175426",  
  "largeFaceListId": "sample_list",  
  "largeFaceListId": "sample_list",  
  "maxNumOfCandidatesReturned": 10,  
  "mode": "   
}
```

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

Box 1: detect

Face - Detect With Url: Detect human faces in an image, return face rectangles, and optionally with faceIds, landmarks, and attributes.

POST {Endpoint}/face/v1.0/detect

Box 2: matchPerson

Find similar has two working modes, "matchPerson" and "matchFace". "matchPerson" is the default mode that it tries to find faces of the same person as possible

by using internal same-person thresholds. It is useful to find a known person's other photos. Note that an empty list will be returned if no faces pass the internal thresholds. "matchFace" mode ignores same-person thresholds and returns ranked similar faces anyway, even the similarity is low. It can be used in the cases like searching celebrity-looking faces.

Reference:

<https://docs.microsoft.com/en-us/rest/api/faceapi/face/detectwithurl>

<https://docs.microsoft.com/en-us/rest/api/faceapi/face/findsimilar>

## QUESTION 5

### HOTSPOT

You develop a test method to verify the results retrieved from a call to the Computer Vision API. The call is used to analyze the existence of company logos in images. The call returns a collection of brands named brands.

You have the following code segment.

```
foreach (var brand in brands)
{
    if (brand.Confidence >= .75)
        Console.WriteLine($"Logo of {brand.Name} between {brand.Rectangle.X},
{brand.Rectangle.Y} and {brand.Rectangle.W}, {brand.Rectangle.H}");
}
```

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

**NOTE:** Each correct selection is worth one point.

**Hot Area:**

#### Answer Area

Statements	Yes	No
The code will return the name of each detected brand with a confidence equal to or higher than 75 percent.	<input type="radio"/>	<input type="radio"/>
The code will return coordinates for the bottom-left corner of the rectangle that contains the brand logo of the displayed brands.	<input type="radio"/>	<input type="radio"/>
The code will return coordinates for the bottom-right corner of the rectangle that contains the brand logo of the displayed brands.	<input type="radio"/>	<input type="radio"/>

**Correct Answer:**

**Answer Area**

Statements	Yes	No
The code will return the name of each detected brand with a confidence equal to or higher than 75 percent.	<input checked="" type="radio"/>	<input type="radio"/>
The code will return coordinates for the bottom-left corner of the rectangle that contains the brand logo of the displayed brands.	<input checked="" type="radio"/>	<input type="radio"/>
The code will return coordinates for the bottom-right corner of the rectangle that contains the brand logo of the displayed brands.	<input type="radio"/>	<input checked="" type="radio"/>

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

Box 1: Yes

Box 2: Yes

If several logs are detected, or the logo image and the stylized brand name are detected as two separate logos, it starts numbering them from the bottom-left corner.

Box 3: No

Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/concept-brand-detection>

**QUESTION 6**

**HOTSPOT**

You develop an application that uses the Face API.

You need to add multiple images to a person group.

How should you complete the code? To answer, select the appropriate options in the answer area.

**NOTE:** Each correct selection is worth one point.

## Hot Area:

### Answer Area

```
Parallel.For(0, PersonCount, async i =>
{
    Guid personId = persons[i].PersonId;
    string personImageDir = $"/path/to/person/{i}/images";
    foreach (string imagePath in Directory.GetFiles(personImageDir, "*.jpg"))
    {
        using (  t = File.OpenRead(imagePath))

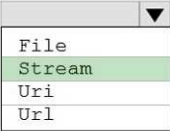
        {
            await faceClient.PersonGroupPerson. 

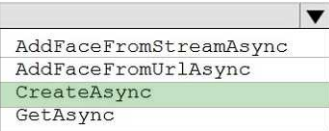
            (personGroupId, personId, t);
        }
    }
});
```

## Correct Answer:



### Answer Area

```
Parallel.For(0, PersonCount, async i =>
{
    Guid personId = persons[i].PersonId;
    string personImageDir = $"/path/to/person/{i}/images";
    foreach (string imagePath in Directory.GetFiles(personImageDir, "*.jpg"))
    {
        using (  t = File.OpenRead(imagePath))

        {
            await faceClient.PersonGroupPerson. 

            (personGroupId, personId, t);
        }
    }
});
```

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

Box 1: Stream

The File.OpenRead(String) method opens an existing file for reading.

Example: Open the stream and read it back.

```
using (FileStream fs = File.OpenRead(path))
```

Box 2: CreateAsync

Create the persons for the PersonGroup. Persons are created concurrently.

Example:

```
await faceClient.PersonGroupPerson.CreateAsync(personGroupId, personName);
```

Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/face/face-api-how-to-topics/how-to-add-faces>

## QUESTION 7

### HOTSPOT

You are developing an application that will use the Computer Vision client library. The application has the following code.

```
public async Task AnalyzeImage(ComputerVisionClient client, string localImage)
{
    List<VisualFeatureTypes> features = new List<VisualFeatureTypes>()
    {
        VisualFeatureTypes.Description,
        VisualFeatureTypes.Tags,
    };
    using (Stream imageStream = File.OpenRead(localImage))
    {
        try
        {
            ImageAnalysis results = await client.AnalyzeImageInStreamAsync(imageStream, features);

            foreach (var caption in results.Description.Captions)
            {
                Console.WriteLine($"{caption.Text} with confidence {caption.Confidence}");
            }

            foreach (var tag in results.Tags)
            {
                Console.WriteLine($"{tag.Name} {tag.Confidence}");
            }
        }
        catch (Exception ex)
        {
            Console.WriteLine(ex.Message);
        }
    }
}
```

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

**NOTE:** Each correct selection is worth one point.

**Hot Area:**

#### Answer Area

Statements	Yes	No
The code will perform face recognition.	<input type="radio"/>	<input type="radio"/>
The code will list tags and their associated confidence.	<input type="radio"/>	<input type="radio"/>
The code will read a file from the local file system.	<input type="radio"/>	<input type="radio"/>

**Correct Answer:**

**Answer Area**

Statements	Yes	No
The code will perform face recognition.	<input type="radio"/>	<input checked="" type="radio"/>
The code will list tags and their associated confidence.	<input checked="" type="radio"/>	<input type="radio"/>
The code will read a file from the local file system.	<input type="radio"/>	<input checked="" type="radio"/>

**Section: (none)**

**Explanation****Explanation/Reference:**

Explanation:

Box 1: No

Box 2: Yes

The ComputerVision.analyzeImageInStreamAsync operation extracts a rich set of visual features based on the image content.

Box 3: No

Images will be read from a stream.

Reference:

<https://docs.microsoft.com/en-us/java/api/com.microsoft.azure.cognitiveservices.vision.computervision.computervision.analyzeimageinstreamasync>

**QUESTION 8**

You are developing a method that uses the Computer Vision client library. The method will perform optical character recognition (OCR) in images. The method has the following code.

```

public static async Task ReadFileUrl(ComputerVisionClient client, string urlFile)
{
    const int numberOfCharsInOperationId = 36;

    var txtHeaders = await client.ReadAsync(urlFile, language: "en");

    string opLocation = textHeaders.OperationLocation;
    string operationId = opLocation.Substring(opLocation.Length -
        numberOfCharsInOperationId);

    ReadOperationResult results;

    results = await client.GetReadResultAsync(Guid.Parse(operationId));

    var textUrlFileResults = results.AnalyzeResult.ReadResults;
    foreach (ReadResult page in textUrlFileResults)
    {
        foreach (Line line in page.Lines)
        {
            Console.WriteLine(line.Text);
        }
    }
}

```

During testing, you discover that the call to the `GetReadResultAsync` method occurs before the read operation is complete.

You need to prevent the `GetReadResultAsync` method from proceeding until the read operation is complete.

Which two actions should you perform? Each correct answer presents part of the solution. (Choose two.)

**NOTE:** Each correct selection is worth one point.

- A. Remove the `Guid.Parse(operationId)` parameter.
- B. Add code to verify the `results.Status` value.
- C. Add code to verify the status of the `txtHeaders.Status` value.
- D. Wrap the call to `GetReadResultAsync` within a loop that contains a delay.

**Correct Answer:** BD

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Explanation:

Example code :

```

do
{
    results = await client.GetReadResultAsync(Guid.Parse(operationId));
}

```

```
}  
while ((results.Status == OperationStatusCodes.Running ||  
    results.Status == OperationStatusCodes.NotStarted));
```

Reference:

<https://github.com/Azure-Samples/cognitive-services-quickstart-code/blob/master/dotnet/ComputerVision/ComputerVisionQuickstart.cs>

## Implement Natural Language Processing Solutions

### Question Set 1

#### QUESTION 1

You have a chatbot that was built by using the Microsoft Bot Framework.

You need to debug the chatbot endpoint remotely.

Which two tools should you install on a local computer? Each correct answer presents part of the solution. (Choose two.)

**NOTE:** Each correct selection is worth one point.

- A. Fiddler
- B. Bot Framework Composer
- C. Bot Framework Emulator
- D. Bot Framework CLI
- E. ngrok
- F. nginx

**Correct Answer:** CE

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Explanation:

Bot Framework Emulator is a desktop application that allows bot developers to test and debug bots, either locally or remotely.

ngrok is a cross-platform application that "allows you to expose a web server running on your local machine to the internet." Essentially, what we'll be doing is using ngrok to forward messages from external channels on the web directly to our local machine to allow debugging, as opposed to the standard messaging endpoint configured in the Azure portal.

Reference:

<https://docs.microsoft.com/en-us/azure/bot-service/bot-service-debug-emulator>

#### QUESTION 2

DRAG DROP

You are building a retail chatbot that will use a QnA Maker service.

You upload an internal support document to train the model. The document contains the following question: "What is your warranty period?"

Users report that the chatbot returns the default QnA Maker answer when they ask the following question: "How long is the warranty coverage?"

The chatbot returns the correct answer when the users ask the following question: 'What is your warranty period?'

Both questions should return the same answer.

You need to increase the accuracy of the chatbot responses.

Which three actions should you perform in sequence? To answer, move the appropriate actions from the list of actions to the answer area and arrange them in the correct order. (Choose three.)

**Select and Place:**

Actions	Answer Area
Add a new question and answer (QnA) pair.	
Retrain the model.	
Add additional questions to the document.	
Republish the model.	
Add alternative phrasing to the question and answer (QnA) pair.	

**Correct Answer:**

Actions	Answer Area
Add a new question and answer (QnA) pair.	Add alternative phrasing to the question and answer (QnA) pair.
Retrain the model.	Retrain the model.
Add additional questions to the document.	Republish the model.
Republish the model.	
Add alternative phrasing to the question and answer (QnA) pair.	

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

Step 1: Add alternative phrasing to the question and answer (QnA) pair.

Add alternate questions to an existing QnA pair to improve the likelihood of a match to a user query.

Step 2: Retrain the model.

Periodically select Save and train after making edits to avoid losing changes.

Step 3: Republish the model

Note: A knowledge base consists of question and answer (QnA) pairs. Each pair has one answer and a pair contains all the information associated with that answer.

Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/qnamaker/how-to/edit-knowledge-base>

### **QUESTION 3**

You need to measure the public perception of your brand on social media messages.

Which Azure Cognitive Services service should you use?

- A. Text Analytics
- B. Content Moderator
- C. Computer Vision
- D. Form Recognizer

**Correct Answer: A**

**Section: (none)**

**Explanation**

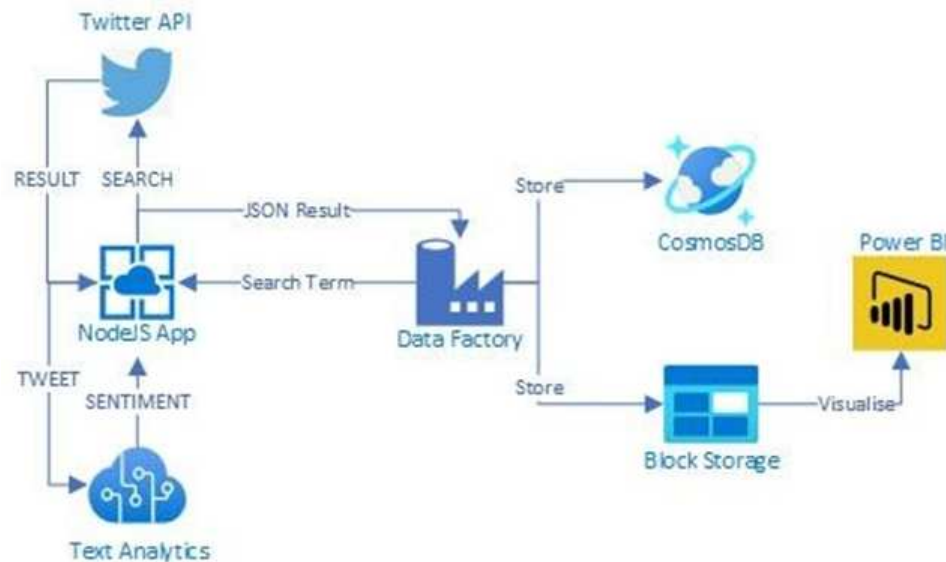
**Explanation/Reference:**

Explanation:

Text Analytics Cognitive Service could be used to quickly determine the public perception for a specific topic, event or brand.

Example: A NodeJS app which pulls Tweets from Twitter using the Twitter API based on a specified search term. Then pass these onto Text Analytics for sentiment scoring before storing the data and building a visualisation in PowerBI. The Architecture looked something like this:





Reference:

<https://www.linkedin.com/pulse/measuring-public-perception-azure-cognitive-services-steve-dalai>

#### QUESTION 4

**Note:** This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.

**After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.**

You build a language model by using a Language Understanding service. The language model is used to search for information on a contact list by using an intent named `FindContact`.

A conversational expert provides you with the following list of phrases to use for training.

- Find contacts in London.
- Who do I know in Seattle?
- Search for contacts in Ukraine.

You need to implement the phrase list in Language Understanding.

Solution: You create a new intent for location.

Does this meet the goal?

- A. Yes
- B. No

**Correct Answer:** A

**Section:** (none)

**Explanation**

**Explanation/Reference:**

Explanation:

An intent represents a task or action the user wants to perform. It is a purpose or goal expressed in a user's utterance.

Define a set of intents that corresponds to actions users want to take in your application.

Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/luis/luis-concept-intent>

## QUESTION 5

**Note:** This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.

**After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.**

You build a language model by using a Language Understanding service. The language model is used to search for information on a contact list by using an intent named `FindContact`.

A conversational expert provides you with the following list of phrases to use for training.

- Find contacts in London.
- Who do I know in Seattle?
- Search for contacts in Ukraine.

You need to implement the phrase list in Language Understanding.

Solution: You create a new entity for the domain.

Does this meet the goal?

- A. Yes

B. No

**Correct Answer: B**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

Instead use a new intent for location.

Note: An intent represents a task or action the user wants to perform. It is a purpose or goal expressed in a user's utterance.

Define a set of intents that corresponds to actions users want to take in your application.

Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/luis/luis-concept-intent>

#### **QUESTION 6**

**Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.**

**After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.**

You build a language model by using a Language Understanding service. The language model is used to search for information on a contact list by using an intent named `FindContact`.

A conversational expert provides you with the following list of phrases to use for training.

- Find contacts in London.
- Who do I know in Seattle?
- Search for contacts in Ukraine.

You need to implement the phrase list in Language Understanding.

Solution: You create a new pattern in the `FindContact` intent.

Does this meet the goal?

A. Yes

B. No

**Correct Answer: B**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

Instead use a new intent for location.

Note: An intent represents a task or action the user wants to perform. It is a purpose or goal expressed in a user's utterance.

Define a set of intents that corresponds to actions users want to take in your application.

Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/luis/luis-concept-intent>

### **QUESTION 7**

**Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.**

**After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.**

You develop an application to identify species of flowers by training a Custom Vision model.

You receive images of new flower species.

You need to add the new images to the classifier.

Solution: You add the new images, and then use the Smart Labeler tool.

Does this meet the goal?

A. Yes

B. No

**Correct Answer: B**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

The model need to be extended and retrained.

Note: Smart Labeler to generate suggested tags for images. This lets you label a large number of images more quickly when training a Custom Vision model.

#### QUESTION 8

**Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.**

**After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.**

You develop an application to identify species of flowers by training a Custom Vision model.

You receive images of new flower species.

You need to add the new images to the classifier.

Solution: You add the new images and labels to the existing model. You retrain the model, and then publish the model.

Does this meet the goal?

A. Yes

B. No

**Correct Answer: A**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

The model needs to be extended and retrained.

#### QUESTION 9

**Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.**

**After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.**

You develop an application to identify species of flowers by training a Custom Vision model.

You receive images of new flower species.

You need to add the new images to the classifier.

Solution: You create a new model, and then upload the new images and labels.

Does this meet the goal?

A. Yes

B. No

**Correct Answer: B**

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

The model needs to be extended and retrained.

## Implement Natural Language Processing Solutions

### Testlet 2

#### Case study

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

#### To start the case study

To display the first question in this case study, click the **Next** button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an **All Information** tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the **Question** button to return to the question.

#### Overview

#### Existing Environment

A company named Wide World Importers is developing an e-commerce platform.

You are working with a solutions architect to design and implement the features of the e-commerce platform. The platform will use microservices and a serverless environment built on Azure.

Wide World Importers has a customer base that includes English, Spanish, and Portuguese speakers.

#### Applications

Wide World Importers has an App Service plan that contains the web apps shown in the following table.

Name	Description
Product Management	An app used by employees to create and manage products. The app and the expected inputs from the employees are in English.
Inventory Tracking	An app used by employees to manage inventory when dispatching orders, receiving refunds, and receiving consignments from suppliers.

## Azure Resources

You have the following resources:

- An Azure Active Directory (Azure AD) tenant
  - The tenant supports internal authentication.
  - All employees belong to a group named AllUsers.
  - Senior managers belong to a group named LeadershipTeam.
- An Azure Functions resource
  - A function app posts to Azure Event Grid when stock levels of a product change between OK, Low Stock, and Out of Stock. The function app uses the Azure Cosmos DB change feed.
- An Azure Cosmos DB account
  - The account uses the Core (SQL) API.
  - The account stores data for the Product Management app and the Inventory Tracking app.
- An Azure Storage account
  - The account contains blob containers for assets related to products.
  - The assets include images, videos, and PDFs.
- An Azure Cognitive Services resource named wwics
- A Video Indexer resource named wwivi

## Requirements

### Business Goals

Wide World Importers wants to leverage AI technologies to differentiate itself from its competitors.

### Planned Changes

Wide World Importers plans to start the following projects:

- A product creation project: Help employees create accessible and multilingual product entries, while expediting product entry creation.
- A smart e-commerce project: Implement an Azure Cognitive Search solution to display products for customers to browse.
- A shopping on-the-go project: Build a chatbot that can be integrated into smart speakers to support customers.

### Business Requirements



Wide World Importers identifies the following business requirements for all the projects:

- Provide a multilingual customer experience that supports English, Spanish, and Portuguese.
- Whenever possible, scale based on transaction volumes to ensure consistent performance.
- Minimize costs.

### **Governance and Security Requirements**

Wide World Importers identifies the following governance and security requirements:

- Data storage and processing must occur in datacenters located in the United States.
- Azure Cognitive Services must be inaccessible directly from the internet.

### **Accessibility Requirements**

Wide World Importers identifies the following accessibility requirements:

- All images must have relevant alt text.
- All videos must have transcripts that are associated to the video and included in product descriptions.
- Product descriptions, transcripts, and all text must be available in English, Spanish, and Portuguese.

### **Product Creation Requirements**

Wide World Importers identifies the following requirements for improving the Product Management app:

- Minimize how long it takes for employees to create products and add assets.
- Remove the need for manual translations.

### **Smart E-Commerce Requirements**

Wide World Importers identifies the following requirements for the smart e-commerce project:

- Ensure that the Cognitive Search solution meets a Service Level Agreement (SLA) of 99.9% availability for searches and index writes.
- Provide users with the ability to search insight gained from the images, manuals, and videos associated with the products.
- Support autocompletion and autosuggestion based on all product name variants.
- Store all raw insight data that was generated, so the data can be processed later.
- Update the stock level field in the product index immediately upon changes.
- Update the product index hourly.

### **Shopping On-the-Go Requirements**

Wide World Importers identifies the following requirements for the shopping on-the-go chatbot:

- Answer common questions.
- Support interactions in English, Spanish, and Portuguese.
- Replace an existing FAQ process so that all Q&A is managed from a central location.
- Provide all employees with the ability to edit Q&As. Only senior managers must be able to publish updates.
- Support purchases by providing information about relevant products to customers. Product displays must include images and warnings when stock levels are low or out of stock.

### Product JSON Sample

You have the following JSON sample for a product.

```
{
  "sku": "b1",
  "name": {
    "en": "Bicycle",
    "es": "Bicicleta",
    "pt": "Bicicleta"
  },
  "stocklevel": "Out of Stock",
  "description": {
    "en": "Bicycle",
    "es": "Bicicleta",
    "pt": "Bicicleta"
  },
  "image": {
    "uri": "https://upload.worldwideimporters.org/bicycle.jpg",
    "alttext": {
      "en": "Bicycle",
      "es": "Bicicleta",
      "pt": "Bicicleta"
    }
  },
  "createdUtc": "2020-02-14T06:08:39Z",
  "language": "en"
}
```

### QUESTION 1

#### HOTSPOT

You are planning the product creation project.

You need to build the REST endpoint to create the multilingual product descriptions.

How should you complete the URI? To answer, select the appropriate options in the answer area.

**NOTE:** Each correct selection is worth one point.

**Hot Area:**

**Answer Area**

		?api-version=3.0&to=es&to=pt
api.cognitive.microsofttranslator.com	/detect	
api-nam.cognitive.microsofttranslator.com	/languages	
westus.tts.speech.microsoft.com	/text-to-speech	
wwics.cognitiveservices.azure.com/translator	/translate	

**Correct Answer:**

**Answer Area**

		?api-version=3.0&to=es&to=pt
api.cognitive.microsofttranslator.com	/detect	
api-nam.cognitive.microsofttranslator.com	/languages	
westus.tts.speech.microsoft.com	/text-to-speech	
wwics.cognitiveservices.azure.com/translator	/translate	

**Section: (none)**

**Explanation**

**Explanation/Reference:**

Explanation:

Box 1: api.cognitive.microsofttranslator.com

Translator 3.0: Translate. Send a POST request to:

<https://api.cognitive.microsofttranslator.com/translate?api-version=3.0>

Box 2: /translate

Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/translator/reference/v3-0-translate>