Instructions:

In the zip file downloadable at https://drive.google.com/file/d/1RCkuJhwIqpOzX7_y1Cx9G3dTu5FSsBK8/view?usp=sharing are DICOM CT Image files and DICOM RT Structure Set files. These files belong to 3 different CT scans (you will need to read the files to find out which scan they belong to).

Your task is to write python code to determine **for each scan**:

- The "Patient ID" (https://dicom.innolitics.com/ciods/ct-image/patient/00100020) from the DICOM CT Image files.
- The total number of DICOM CT Image files
- The volume in cm^3 of the "HEART" structure

Use the Python library "pydicom" (https://github.com/pydicom/pydicom) to read the DICOM files.

Code can be submitted as python files or within a jupyter notebook. Email code and results to carter@limbus.ai and cc jon@limbus.ai.

Tips:

- There are multiple DICOM CT Image files for each scan
- There is one DICOM RT Structure Set file for each scan. These files contain contour coordinate data for structures in that scan.
- DICOM CT Image files and DICOM RT Structure Set files that belong to the same scan share the same "Study Instance UID" attribute, found in this DICOM tag for DICOM CT Image files https://dicom.innolitics.com/ciods/ct-image/general-study/0020000d, and this DICOM tag for DICOM RT Structure Set files https://dicom.innolitics.com/ciods/rt-structure-set/general-study/0020000d
- For RT Structure Set files, the index of the element in "Structure Set ROI Sequence" (https://dicom.innolitics.com/ciods/rt-structure-set/structure-set/30060020) that has the "ROI Name" (https://dicom.innolitics.com/ciods/rt-structure-set/structure-set/30060020/30060026) equal to "HEART" is the same index you will need to use to access "ROI Contour Sequence" (https://dicom.innolitics.com/ciods/rt-structure-set/roi-contour/30060039) to get the "HEART" element of that sequence. That element has an attribute "Contour Sequence" (https://dicom.innolitics.com/ciods/rt-structure-set/roi-contour/30060039/30060040): each element in that sequence corresponds to one of multiple 2D contours (made in the axial plane) for "HEART". The contour coordinate data can be found in "Contour Data" (https://dicom.innolitics.com/ciods/rt-structure-set/roi-contour/30060039/30060040/30060050).