Examine the XML output and write XPaths for the following (5 points each)

Problem 1: To return the term code (<TargetTermCode>) for the mapped (end) term mapped to the initial code (<SourceTermCode>) “296.55”.

/ArrayOfTranscodeResult/TranscodeResult/SourceTermCode[text()= '296.55']/../TargetTermCode[text()]

Problem 2: To return the term code (<TargetTermCode>) for the mapped (end) term mapped to the initial code (<SourceTermCode>) “354.5” (Hint: Same as above, just change the code)

/ArrayOfTranscodeResult/TranscodeResult/SourceTermCode[text()= '354.5']/../TargetTermCode[text()]

Problem 3: To return the term description (<TargetTerm>) for the mapped (end) term mapped to the initial code (<SourceTermCode>) “354.5”.

/ArrayOfTranscodeResult/TranscodeResult/SourceTermCode[text()= '354.5']/../TargetTerm[text()]

Problem 4: For the code in PROBLEM\_1\_RESULT, the billable status of the code (hint, it is inside an element called <Attribute name=”Billable”>

/ArrayOfTermSearchItem/TermSearchItem/TermSourceCode[text()='F31.75']/../AttributesXML/Attributes/Attribute[@name='Billable']

Problem 5 (Challenge): For the code in PROBLEM\_1\_RESULT, the external OMOP code (hint, look for children of <ExternalCodes> and pull out the right one by referencing the <Code> grandchild that is a sibling of the <Name> grandchild with value ‘OMOP’)

/ArrayOfTermSearchItem/TermSearchItem/TermSourceCode[text()='F31.75']/../ExternalCodes/ExternalCode/Name[text()='OMOP']/../Code[text()]

6.

As you can tell, the mapping for term with code 296.55 is not lexical (literally identical). What do you think might be semantic differences between the source and target terms?

It is always important to preserve the meaning of information being exchanged through electronic health records (EHRs) as this data plays a key role in semantic interoperability. This information is critical for ensuring patient safety and leveraging the standards-based clinical decisions. Semantic interoperability can be achieved my mapping the data points available in the EHRs to standard terminologies like SNOMED-CT, ICD-10, LOINC and RxNorm. But problems have been identified with the mapped terminology for bidirectional usage. The general concept of mapping refers to a basic understanding of the code being mapped between the two systems. A mapping allows a target system to understand clinical data generated by a source system. In this process of transformation, particularly when it is unidirectional, there is an ample chance for information loss that can affect the patient care and outcomes. In the given use case, the source term code is 296.55 with term description as bipolar I disorder, most recent episode (or current) depressed, in partial or unspecified remission. When mapped to the target term, the code is changed to F31.75 with meaning bipolar disorder, in partial remission, most recent episode depressed. In the source term, the level of bipolar disorder is mentioned which is missing in the target term. In the source term, the episode is described as either recent or current but in the target term it is given only as current which might rule out the possibility of recent episodes while forming diagnosis or prescribing medication. Additionally, the information regarding the unspecified remission in not addressed in the target term. As the level/stage of bipolar disorder is not mentioned in the target term, there might be chances of alerted diagnosis and varied treatment protocols. Also, information regarding a single condition will be variedly stored in the EHRs of the two organizations. When the patient visits each of the organization, different conclusions are given, hampers the patient safety.

This created a semantic gap in the terms mapped across two different terminologies. The concept of semantic interoperability is threatened. So according to the literature, to avoid such errors in the clinical content, creating logical expressions and integrating terminologies using Unified Medical Language System (UMLS) is recommended (Fung et al., 2007).

Reference:

Fung, K. W., Bodenreider, O., Aronson, A. R., Hole, W. T., & Srinivasan, S. (2007). Combining lexical and semantic methods of inter-terminology mapping using the UMLS. *Studies in Health Technology and Informatics*, *129*(Pt 1), 605–609. <https://pubmed-ncbi-nlm-nih-gov.proxy.ulib.uits.iu.edu/17911788/>

Part-B

Problem 7: A list of all codes (<TermSourceCode>) to all related terms

/ArrayOfRelatedTermResult/RelatedTermResult/RelatedItems/RelatedTermItem/RelatedTerm/TermSourceCode[text()]

Problem 8: A list of term descriptions (<TermDescription>) of all related terms

/ArrayOfRelatedTermResult/RelatedTermResult/RelatedItems/RelatedTermItem/RelatedTerm/TermDescription[text()]

**9. DOUBT IN THE QUESTION ITSELF**

Problem 9: A list of available relation types (<RelationshipMnemonic>) to this term

This is the code for prostate cancer

/ArrayOfRelatedTermResult/RelatedTermResult/RelatedItems/RelatedTermItem/RelatedTerm/ TermDescription[text()= 'Primary malignant neoplasm of prostate']/../ModelRelationsXML/Relations/Relation/@type

This is the code for all the items

/ArrayOfRelatedTermResult/RelatedTermResult/RelatedItems/RelatedTermItem/RelationshipMnemonic[text()]

Problem 10: The term code (<TermSourceCode>) of this related term

/ArrayOfRelatedTermResult/RelatedTermResult/RelatedItems/RelatedTermItem/RelationshipMnemonic[text()='SCT\_ASSDMORPHOLOGY']/../RelatedTerm/TermSourceCode[text()]

Problem 11: The term description (<TermDescription>) of this related term

/ArrayOfRelatedTermResult/RelatedTermResult/RelatedItems/RelatedTermItem/RelationshipMnemonic[text()='SCT\_ASSDMORPHOLOGY']/../RelatedTerm/TermDescription[text()]

Problem 12: The semantic tag attribute (located inside <AttributesXML><Attributes><Attribute name=’SemanticTag’>…) of the related term whose relationship type is Finding Site (<RelationshipMnemonic> is SCT\_FINDINGSITE)

/ArrayOfRelatedTermResult/RelatedTermResult/RelatedItems/RelatedTermItem/RelationshipMnemonic[text()="SCT\_ASSDMORPHOLOGY"]/../RelatedTerm/AttributesXML/Attributes/Attribute[@name='SemanticTag']

Problem 13: A list of UMLSCUI external codes for all related terms (these are located inside <ExternalCode>, where you need to pull the correct <Code> child that corresponds to the <Name> child that is UMLSCUI)

/ArrayOfRelatedTermResult/RelatedTermResult/RelatedItems/RelatedTermItem/RelatedTerm/ExternalCodes/ExternalCode/Name[text()='UMLSCUI']/../Code[text()]

Problem 14: The source codes (<TermSourceCode>) of all related terms located in the SNOMED CT core (these terms are identified where the value of element <AttributesXML><Attributes><Attribute name=’Module’> is “SNOMED CT core”). Additional hint: This requires an “and” statement in XPath

/ArrayOfRelatedTermResult/RelatedTermResult/RelatedItems/RelatedTermItem/RelatedTerm/AttributesXML/Attributes/Attribute[@name='Module'and text()='SNOMED CT core']/../../../TermSourceCode[text()]