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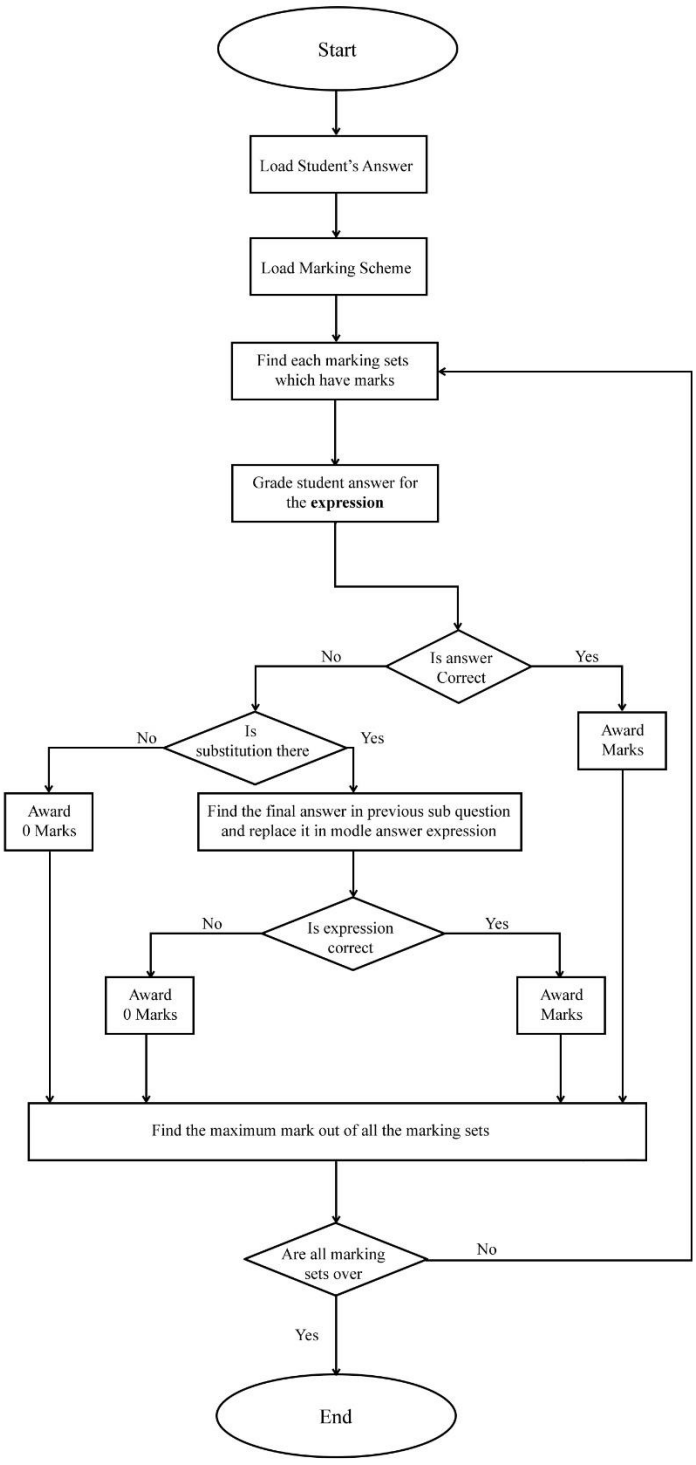
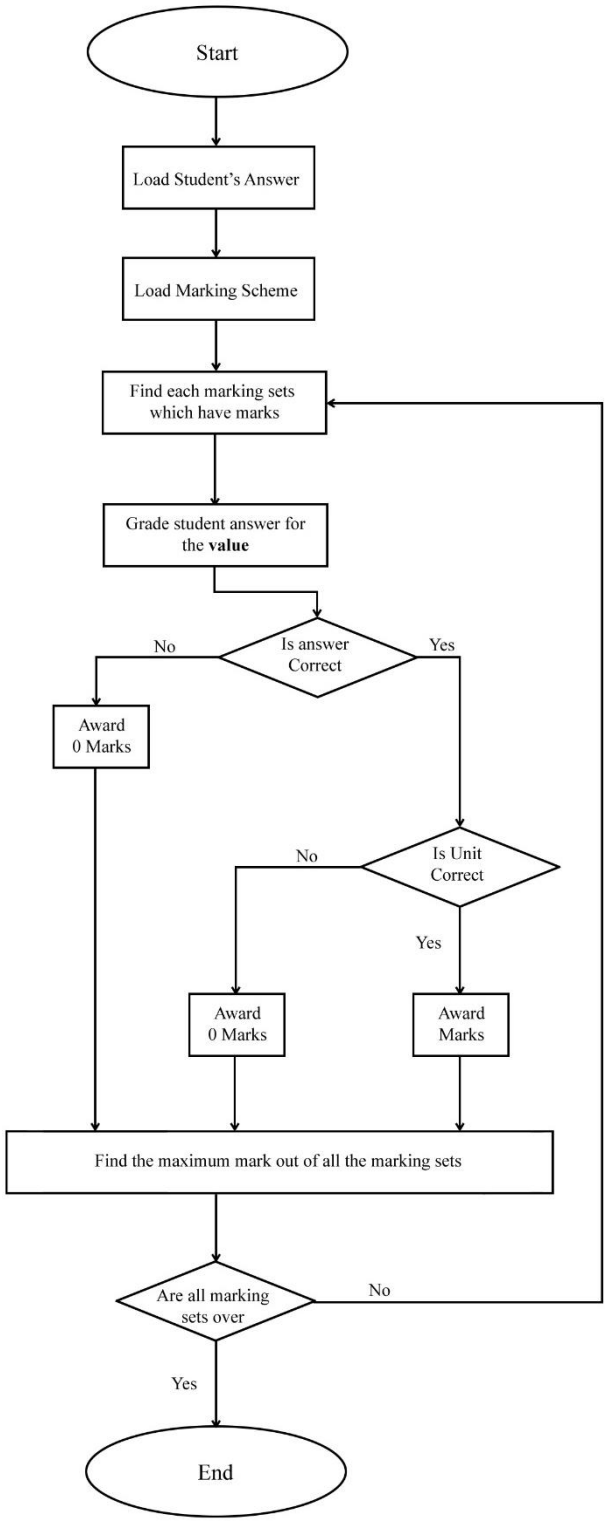
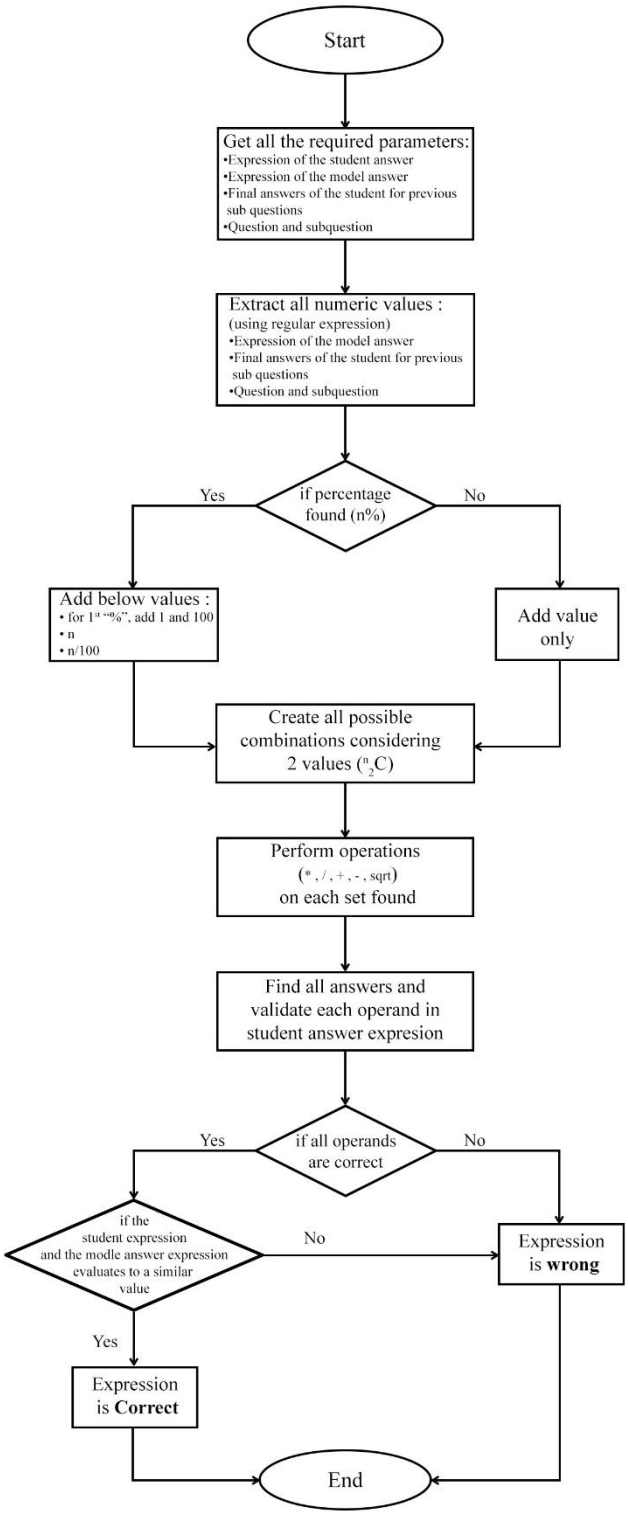
Appendix A: Flow chart for answer expression evaluation



Appendix B: Flow chart for final answer evaluation



Appendix C: Flow chart for Expression validation



Appendix D: Computer Representation of the Marking Rubric, Question, Unit Categorization and the Answer (XML Documents)

```xml
<?xml version="1.0" encoding="UTF-8"?>
<rubric>
    <type>InterestCalculation</type>
    <sectionid>1</sectionid>
    <question id="q01" totalMarks="10">
        <sub_question id="q01-01" totalMarks="1" isProof="true">
            <mark_set id="1">
                <data required="true" isFinal="false" marks="1">
                    <phrase>Total amount spent</phrase>
                    <math_expression unitCompulsory="false" >
                        <mn>600000</mn>
                        <mo>*</mo>
                        <mn>30</mn>
                        <mo>/</mo>
                        <mn>100</mn>
                    </math_expression>
                </data>
                <data required="true" isFinal="true" penalty="1">
                    <value unitCompulsory="true">
                        <preunit>s01-01</preunit>
                        <val>180000</val>
                    </value>
                </data>
            </mark_set>
        </sub_question>
        <sub_question id="q01-02" totalMarks="2" isProof="true">
        <sub_question id="q01-03" totalMarks="2" isProof="false">
        <sub_question id="q01-04" totalMarks="2" isProof="false">
        <sub_question id="q01-05" totalMarks="3" isProof="false">
    </question>
</rubric>
```

Figure D.1 XML representations of rubric document

```xml
<?xml version="1.0" encoding="UTF-8"?>
<units>
    <type>Units</type>
    <local_units id="1">
        <type>Mathematics</type>
        <section id="s01" >
            <name>Currency</name>
            <unit_set id="s01-01">
                <data>රුපියල්</data>
                <data>රු</data>
                <data>Rupee</data>
                <data>Rs</data>
                <data>LKR</data>
                <data>Sri Lankan Rupee</data>
            </unit_set>
            <unit_set id="s01-02">
        </section>
        <section id="s02" >
    </local_units>
</units>
```

Figure D.2 XML representations of unit categorization

```
<?xml version="1.0" encoding="UTF-8"?>
<answer_script>
    <type>AnswerScript</type>
    <student id="RU/E/2010/070">
    <question id="q01" >
        <manualGradingMarks>10</manualGradingMarks>
        <sub_question id="q01-01" >
        <sub_question id="q01-02" >
        <sub_question id="q01-03" >
        <sub_question id="q01-04" >
        <sub_question id="q01-05" >
            <manualGradingMarks_sub>3</manualGradingMarks_sub>
            <answer>Total amount at the end of the second year=420000*1.08^2</answer>
            <answer>=৳489888</answer>
        </sub_question>
    </question>
</answer_script>
```

Figure D.3 XML representations of student answer

Appendix E: Example word problems in Sinhala language

පුද්ගලයෙක් තමා සතු රු .420000 ස්ථාවර ගිණුමක තැන්පත් කරයි. වාර්ෂික වැල් පොලී අනුපාතිකය 8% ක් නම් මුල් වසර දෙක අවසානයේ දී ගිණුමෙහි ඇති මුළු මුදල ගණනය කරන්න.

පලමු වසර අවසානයේ පොලිය	= 420000*8/100
	= Rs.33600
දෙවන වසර අවසානයේ පොලිය	= (420000 + 33600)*8/100
	= Rs.36288
දෙවන වසර අවසානයේ මුළු මුදල	= 420000 + 33600 + 36288
	= Rs.489888

Figure 1 Numerical word problem and its sample answer

පතුලේ අරය r cm ද උස 12cm ද වන තුනී කුහර කේතුවක් සම්පූර්ණයෙන්ම ජලයෙන් පුරවා පැත්තක දිග 8cm වන සමචතුරස්‍රාකාර පතුලක් සහිත භාජනයකට වත් කරනු ලැබේ. කේතුවේ ජල පරිමාව r ඇසුරින් සොයන්න.

කේතුවේ ජල පරිමාව	= 1/3*π*r^2*h
	=1/3*π*r^2*12
	=4*π*r^2

Figure 2 Algebraic word problem and its sample answer

Appendix F: Sample word set in Sinhala-Sinhala lexical database