

School Geometry Description Language – G++

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Abstract

The most important challenge of e-learning software for school math is to develop a computer program, which can act as a teacher. It can generate question and test the skill set of students. Such automated testing will require knowledge-domain specific computer language to describe the concept and solve it. We have attempted to develop one such language for school geometry. We will call this G++

1 Introduction

The idea of language to aid creating and visualizing geometric object is not new. AutoCAD is one of successful product in this area. However, it is more suited for civil engineer and architect than a high school student learning geometry. We need a computer language, which can help student to prove theorem algorithmically and solve geometric puzzle.

2 Goals

Automation

One of the objectives of this language is to help teacher generate geometry question based on knowledge base. It should also help to them to check the correct answer provided by students. Example: intesection area between two circles with diameter 5 cm and at distance 8 cm.

Visual

Teacher should be able to discribe concept of geometry using this language, which will create a visual movie for quicker learning for student.

Extendability

Basic language will be simple and can be extended for more compex functionality. For example: new geometry algorithm will be added through standard/user library

3 Example Applications

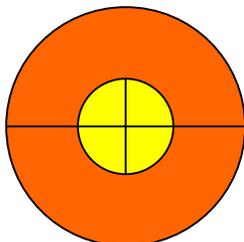
Question generation

Visual display of geometric shape

Movie play of theorem proving

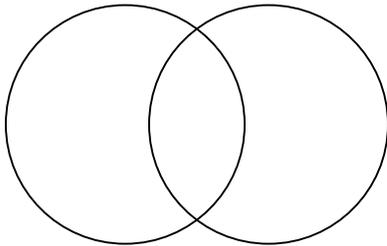
4 Sample Code

Q1: Calculate the area of concentric circle with diameter 5cm and 8cm.



```
DECLARE
  CIRCLE C1, C2;
  OBJECT C3;
BEGIN
  C1=5;
  C2=8;
  C3=C2-C1;
  PRINT AREA OF C3;
END;
```

Q2: Find the area of intersection between two circles having diameter 10cm at a distance of 8 cm.



```
DECLARE
  CIRCLE C1,C2;
  OBJECT C3;
BEGIN
  C1=10;
  C2=C1;
  MOVE C2 TO (8,0)
  C3=C1-C2;
  PRINT AREA OF C3;
  DISPLAY C1,C2,C3
END;
```