CSc 600 - Homework **Dr. Jozo Dujmović**

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1. Using BNF write the syntax definitions of the following objects:
   (a) Natural number (1, 2, 3, …)
   (b) Unsigned integer (0, 1, 2, 3, …)
   (c) Integer (…, -2, -1, 0, 1, 2, …)
   (d) Odd number (…, –3, -1, 1, 3, …)
   (e) Even number (…, –4, -2, 0, 2, 4, …)
   (f) Integer divisible by five (…, -10, -5, 0, 5, 10, …)

2. Show syntax diagrams for questions (a), …, (f) of problem 1. Preferred presentations are based on using a word processor. If you don't know how to use a word processor, try to learn Word or PowerPoint. If you cannot make computer drawing, then hand-draw.

3. Following is an example of input statement in C++ (subscripts can be expressions):

```
cin >> sclr >> vec[2*i-1] >> mat[f(i)][j+k] >> t[i/3][j][k];
```

   Write a BNF definition of the syntax of (all possible) input statements in C++.

4. Following is an example of output statement in C++:

```
cout    << 12.34*a/rate  << "  " << 43.21 << "  "
        << alpha + x[2*i-1] << "  " << (p && q) << "  "
        << pow(t[i][j], 1.2) << " string " << 's'
        << "  " << myfun(x, sin(x+y), third_argument) ;
```

   Write a BNF definition of the syntax of C++ output statements.

   In all cases variables may have any number of indices and indices can be arbitrary arithmetic expressions. Therefore, this part of syntax definition is the same for problems 3 and 4. If you define a simple expression in problem 3, you can use it without redefining in problem 4 (which is just a list of expressions).

   Theoretically, I/O statements can reach rather high level of complexity. It is not necessary that your solutions include options beyond those presented in the above examples (lists of objects and the use of expressions).

Notes: Homework reports must have the title page that contains student name, date, course, and homework number. Use a word processor and produce a readable and well formatted report: papers that don't look as professional engineering reports cannot get full credit. Late homework will not be accepted, except in emergency cases where student and instructor have a previous agreement of accepting a late homework. In cases of provable cheating (non-individual work) all involved will get zero points, and will be reported to CS Department and COSE for a disciplinary procedure.