COMS W4115 Programming Languages and Translators

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Due Date: 10/18/2007
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1 Introduction

My inspiration for designing a Fantasy Football Stat Tracker compiler transpired while participating in a fantasy football league with some friends. While the cost for participating in the fantasy football league is free of charge, most of the online fantasy football services charge a bundle for using their online stat tracker. The FFSTC will provide features for gathering player statistics, sorting based on category type, filtering by position type, stats comparison, and search by player name. In this version of the FFSTC, statistics will only be available for the 2006 Fantasy Football Season.

2 Lexical Conventions

2.1 Tokens

There are six types of tokens in this language: identifiers, keywords, constants, strings, expression operators, and separators. A whitespace must be used to separate tokens.

2.2 Comments

FFSTC supports single and multi-line comments. Single line comments are denoted using the notations @@@. Multi line comments begin with @%% and ends with %%

Example:

@@ This is a valid comment

@%%This is also a valid comment%%

2.3 Identifiers

An identifier is a sequence of letters and digits with the first character beginning with an alphabet. Identifiers are case sensitive; the “_” is allowable
2.4 Keywords

The following are identifiers reserved as keywords and may not be used otherwise.

<table>
<thead>
<tr>
<th>while</th>
<th>endwhile</th>
<th>QB</th>
<th>TeamName</th>
</tr>
</thead>
<tbody>
<tr>
<td>if</td>
<td>else</td>
<td>RB</td>
<td>bool</td>
</tr>
<tr>
<td>endif</td>
<td>bool</td>
<td>WR</td>
<td>int</td>
</tr>
<tr>
<td>FALSE</td>
<td>TRUE</td>
<td>TE</td>
<td></td>
</tr>
<tr>
<td>for</td>
<td>endfor</td>
<td>KKR</td>
<td></td>
</tr>
<tr>
<td>continue</td>
<td>break</td>
<td>DEF</td>
<td></td>
</tr>
</tbody>
</table>

The following are identifiers reserved for designating team names.

```
BUF   BAL   HOU   DEN
MIA   CIN   IND   KAN
NE    CLE   JAC   OAK
NYJ   PIT   TEN   SD
DAL   CHI   ATL   ARI
NYG   DET   CAR   SF
PHI   GB    NO    SEA
WAS   MIN   TB    STL
```

2.5 Constants

Three types of constants are allowed in FFSTC: integer, double, and string. All constants are capitalized.

Example:

```
const MAXYARDS = 100;
```

2.6 Operator

The following operators can be used in FFSTC:

```
=   *=
+=  -=
/=  /=
>   <
>=> <=
&   ||
!=  !
+   -
*   /
```
3 Data Types

The following table shows the data types in FFSTC:

<table>
<thead>
<tr>
<th>Type</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>QB</td>
<td>int</td>
</tr>
<tr>
<td>RB</td>
<td>bool</td>
</tr>
<tr>
<td>KKR</td>
<td></td>
</tr>
<tr>
<td>TE</td>
<td></td>
</tr>
<tr>
<td>DEF</td>
<td></td>
</tr>
<tr>
<td>TeamName</td>
<td></td>
</tr>
</tbody>
</table>

4 Declarations

Declaring variables in FFSTC can take the following form:

QB myQuarterBack;
RB myRunningBack;

QB myQBRankings[10];
RB myRBRankings[10];

4.1 QB Type
The QB type will be associated with the statistical categories passYards, passTD, and passINT.

4.2 RB Type
The RB type will be associated with the statistical categories rushYards, rushTD.

4.3 WR Type
The WR type will be associated with the statistical categories rcvYards, rcvTD.

4.4 TE Type
The RE type will be associated with the statistical categories rcvYards, rcvTD.

4.5 KKR Type
The KKR type will be associated with the statistical categories FGMade, FGMiss.

4.6 DEF Type
The DEF type will be associated with the statistical categories defSACK, defINT.
5 Statements

All statements in FFSTC end in a semi-colon.

5.1 Conditional Statements

The following syntax denotes the if statement:

```plaintext
if (expression)
  statement
endif
```

5.2 Looping Statements

The following syntax denotes the while statement:

```plaintext
while (expression)
  statement
endwhile
```

5.3 Print Statements

The printing for scoring statistics are handled through the build-in function \texttt{FFLPrint(x,y)}. Users may only use print statements to echo messages.

For Example:

```plaintext
printf("Hello World.");
```

6 Scope

In FFSTC, all variables declared will be represented as global variables. All declarations should be declared in the beginning of the file.
7 Built-in Functions

All Built-in functions in FFSTC begin with FFL.

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFLGetDatabase();</td>
<td>Required in the beginning of program. Without this declaration, FFSTC will not be able to obtain records.</td>
</tr>
<tr>
<td>bool FFLSearch(Para1,Para2,Para3,Para4);</td>
<td>Search for the statistics for a specified position type by name and team and stores the value for position type. Returns true or false.</td>
</tr>
<tr>
<td>Para1 ➔ Position Type</td>
<td></td>
</tr>
<tr>
<td>Para2 ➔ Lastname</td>
<td></td>
</tr>
<tr>
<td>Para3 ➔ Firstname</td>
<td></td>
</tr>
<tr>
<td>Para4 ➔ Team Identifier</td>
<td></td>
</tr>
<tr>
<td>For Example:</td>
<td></td>
</tr>
<tr>
<td>QB myQB;</td>
<td></td>
</tr>
<tr>
<td>bool isFound (false);</td>
<td></td>
</tr>
<tr>
<td>isFound = FFLSearch(myQB, “Favre”, “Bret”, GB);</td>
<td></td>
</tr>
<tr>
<td>int FFLRetrieve(Para1,Para2,Para3,Para4);</td>
<td>Retrieve the statistics for a specified position type ranked highest by the statistic category type. The record will be stored into an array and the record with the highest ranking will be returned.</td>
</tr>
<tr>
<td>Para1 ➔ Position Type</td>
<td></td>
</tr>
<tr>
<td>Para2 ➔ Position Identifier</td>
<td></td>
</tr>
<tr>
<td>Para2 ➔ statistic category</td>
<td></td>
</tr>
<tr>
<td>Para3 ➔ number of records</td>
<td></td>
</tr>
<tr>
<td>Para4 ➔ Team Identifier</td>
<td></td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>QB myQBRankings[11];</td>
<td></td>
</tr>
<tr>
<td>FFLRetrieve(myQBRankings, QB, passYards, 10);</td>
<td></td>
</tr>
<tr>
<td>FFLPrint(Para1, Para2);</td>
<td>Prints the statistics for a specified position type by the entire 2006 season or weekly.</td>
</tr>
<tr>
<td>Para1 ➔ Position Type</td>
<td></td>
</tr>
<tr>
<td>Para2 ➔ 0 denotes entire season, 1-17 denotes weeks 1 through 17.</td>
<td></td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>@@ Prints my quarterback statistics for the entire 2006 season FFLPrint(MyQB, 0);</td>
<td></td>
</tr>
<tr>
<td>@@ Prints my quarterback statistics for week 6 FFLPrint(MyQB, 6);</td>
<td></td>
</tr>
<tr>
<td>Options:</td>
<td></td>
</tr>
<tr>
<td>Prints the statistics for a specified TeamName type by weekly only.</td>
<td></td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td><code>@ Prints team scoring totals for week 11</code>&lt;br&gt;<code>FFLPrint(myCustomTeam, 11);</code></td>
<td>Prints team scoring totals for week 11</td>
</tr>
<tr>
<td><code>@ Prints team scoring totals for week 11</code>&lt;br&gt;<code>FFLPrint(myCustomTeam, 11);</code></td>
<td>Prints team scoring totals for week 11</td>
</tr>
</tbody>
</table>

In a fantasy football league, a team consists of seven position types: QB, RB, WR, WR, TE, KKR, and DEF. This build-in function will create a team using specified position types and assign it to TeamName Type.

```plaintext
Para1 ➔ QB Type
Para2 ➔ RB Type
Para3 ➔ WR Type 1
Para4 ➔ WR Type 2
Para5 ➔ TE Type
Para6 ➔ KKR Type
Para7 ➔ DEF Type
```

Example:

```plaintext
TeamName myCustomTeam;
myCustomTeam = FFLFormulateTeam(myQB, myRB, myWR1, myWR2, myTE, myKKR, myDEF);
```

# 8 Functions

User defined functions are not allowed in FFSTC.
9 Sample Program

@@ #FFSTC indicates the beginning of the program
#FFSTC

@@ Required declaration to obtain scoring statistics for all position types
FFLGetDatabase();

QB myQB;
RB myRBRankings[11];
WR myWRRankings[11];
RB myRB;
WR myWR1;
WR myWR2;
TE myTE;
KKR myKicker;
DEF myDefense;
bool isFound(false);
int RBHigh, WRHigh;

@@ Search for the top ten rankings amongst position type based on statistical category
RBHigh = FFLRetrieve(myRBRankings, RB, rushYards, 10);
WRHigh = FFLRetrieve(myWRRankings, WR, rcvYards, 10);

@@ Print the top ten rankings
for (int i=0;i<10;i++)
    FFLPrint(myQBRankings[i], 0);
endfor

@@ Assign my players to the highest ranked position player
myRB = myRBRankings[RBHigh];
myWR = myWRRankings[WRHigh];

@@ Print the seasonal stats for my players.
FFLPrint(myRB, 0);
FFLPrint(myWR, 0);

@@ Search for my starting quarterback
isFound = FFLSearch(myQB, “McNabb”, “Donovan”, PHI);

if (isFound)
    FFLPrint(myQB, 0);
endif

@@ Denotes the end of the program
#ENDFFSTC