Prolog

Go to:

http://etc.ch/g6FA

Or scan the barcode

Prolog
Paper 7 Computer Science
Part 1B and Part II 50%

Andrew Rice

Programming in Logic

- Specify a database of facts and rules
- Execute your program by asking it questions
- Declarative style: focus on what the answer should be rather than how it should be computed
- Based on First Order Logic: Horn clauses solved by linear resolution – covered in the Logic and Proof course

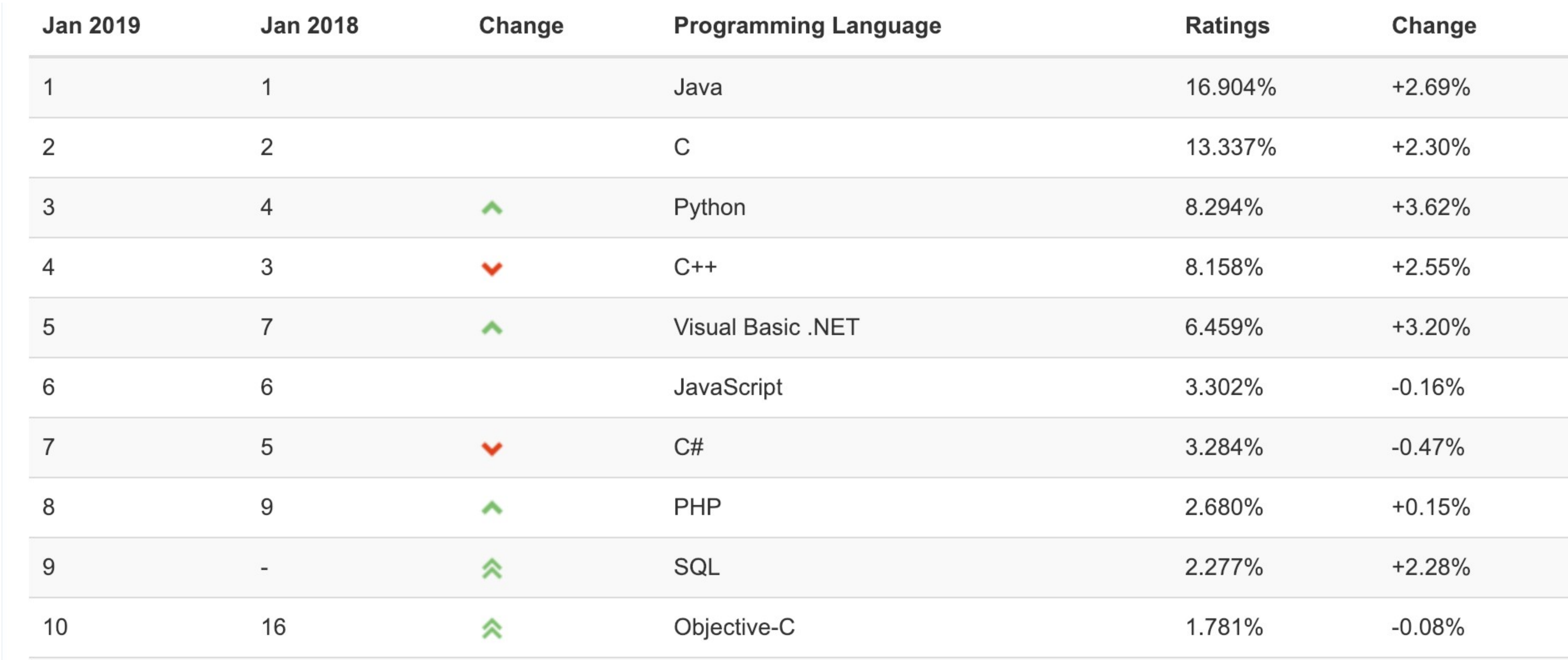
Aims

- Introduce programming in the Prolog language
- A different programming style
- Solve 'real' problems
- Practical experimentation encouraged

Objectives

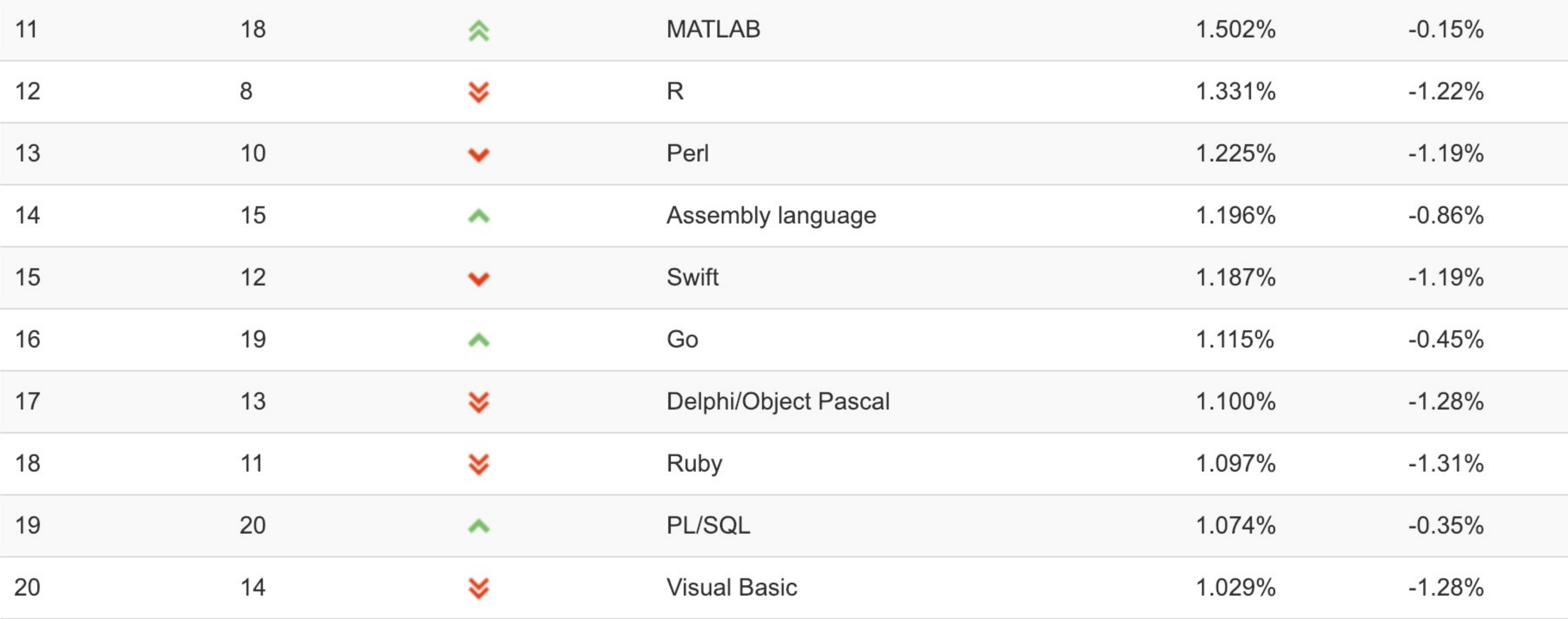
- be able to write programs in Prolog using techniques such as accumulators and difference structures;
- know how to model the backtracking behaviour of program execution;
- appreciate the unique perspective Prolog gives to problem solving and algorithm design;
- understand how larger programs can be created using the basic programming techniques used in this course.

But why would I want to learn Prolog?



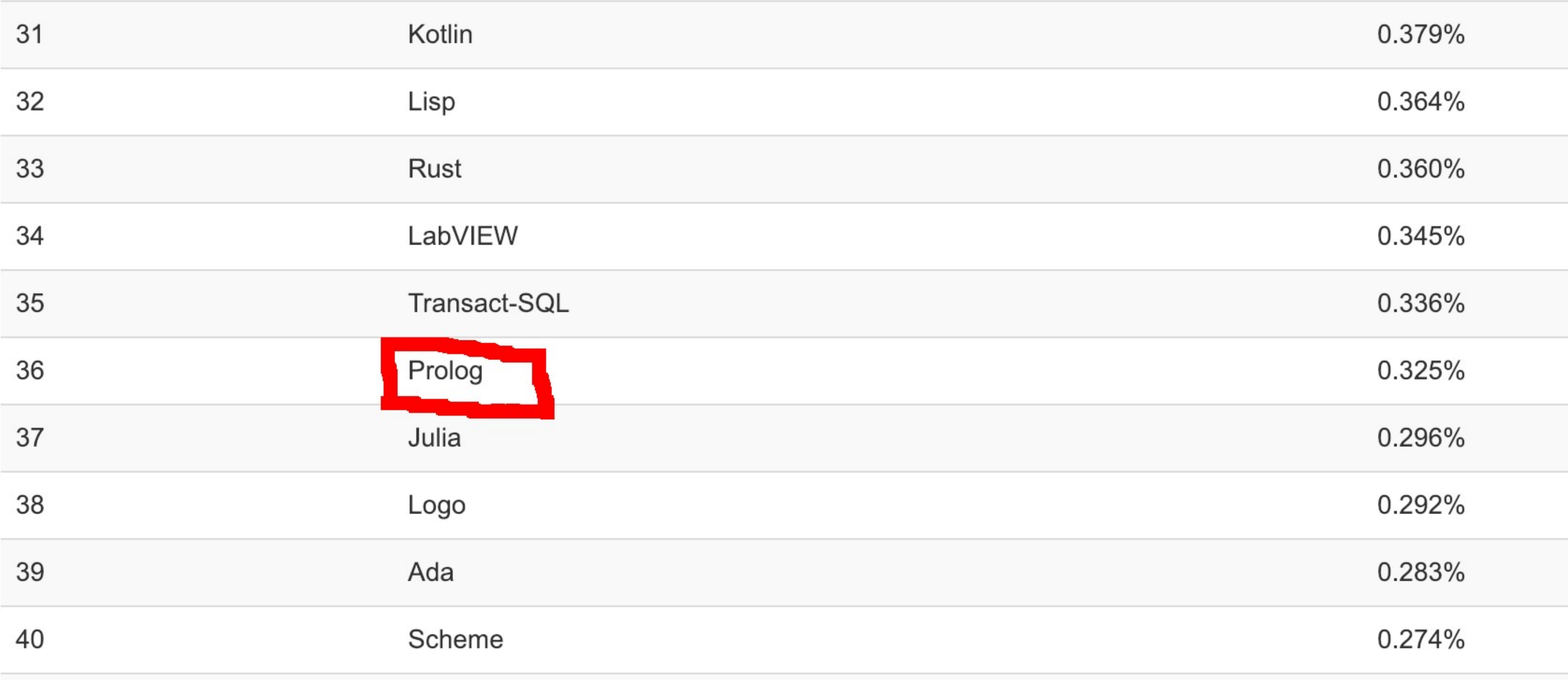
Jan 2019	Jan 2018	Change	Programming Language	Ratings	Change
1	1		Java	16.904%	+2.69%
2	2		C	13.337%	+2.30%
3	4	⌃	Python	8.294%	+3.62%
4	3	⌄	C++	8.158%	+2.55%
5	7	⌃	Visual Basic .NET	6.459%	+3.20%
6	6		JavaScript	3.302%	-0.16%
7	5	⌄	C#	3.284%	-0.47%
8	9	⌃	PHP	2.680%	+0.15%
9	-	︽	SQL	2.277%	+2.28%
10	16	︽	Objective-C	1.781%	-0.08%

https://www.tiobe.com/tiobe-index/



11	18	⇈	MATLAB	1.502%	-0.15%
12	8	⇊	R	1.331%	-1.22%
13	10	⌄	Perl	1.225%	-1.19%
14	15	⌃	Assembly language	1.196%	-0.86%
15	12	⌄	Swift	1.187%	-1.19%
16	19	⌃	Go	1.115%	-0.45%
17	13	⇊	Delphi/Object Pascal	1.100%	-1.28%
18	11	⇊	Ruby	1.097%	-1.31%
19	20	⌃	PL/SQL	1.074%	-0.35%
20	14	⇊	Visual Basic	1.029%	-1.28%

21	Groovy	1.016%
22	SAS	0.962%
23	Dart	0.758%
24	Scratch	0.665%
25	D	0.579%
26	COBOL	0.491%
27	ABAP	0.478%
28	Scala	0.466%
29	Fortran	0.438%
30	Lua	0.399%



31	Kotlin	0.379%
32	Lisp	0.364%
33	Rust	0.360%
34	LabVIEW	0.345%
35	Transact-SQL	0.336%
36	Prolog	0.325%
37	Julia	0.296%
38	Logo	0.292%
39	Ada	0.283%
40	Scheme	0.274%

Why would I want to learn Prolog?

- Example of declarative programming
- Datalog is an interesting subset
  - Not Turing complete – but still useful

Course content will be through videos rather than lectures

- Videos of all the content are available online
- You can watch them whenever you want
  - and for revision

"I can watch them naked at 4am while eating cereal. Also, I can re-watch the parts that I haven't understood ... I can pause the lecture and google something ... or even write some relevant code while the lecture is ongoing, all without missing anything!"

Student pre-course survey

Demo + Section 1

All exercises have a level associated

- **Bookwork** questions that require the students to review the lectured material and locate the relevant information
- **Shallow** questions that require recall of lectured material and its direct application in a formulaic manner
- **Deeper** questions that require students to apply the lectured material in a new context or to relate material to each other but still with a clear right or wrong answer
- **Open** ended questions requiring students to form their own viewpoints with various ways to interpret the answer

Review questions are to encourage you to review the material

- You should be able to find the answer directly from the course material
- Your supervisor probably won't mark them

Review question

“Specify the rules Prolog uses for unification”

Supervision questions are to encourage you to think

- You should be able to solve **Bookwork** and **Shallow** questions without help.
- Your supervisor will not look at these in detail with you unless you ask
- Expect to discuss **Deeper** and **Open** questions

Deeper question

Different implementations of Prolog produce different behaviour when you attempt to unify a(A) with A . Describe the various possibilities which might arise.

Open question

How does unification relate to ML type inference? What is the ML equivalent of unifying a(A) with A ? What behaviour is desirable in this case?

We are collecting statistics about how you use the site

- We will anonymise the data once the course is over
- The data will not be used to assess you

Feedback and problems

- If you are stuck with the content
  - propose a question for the lecture
  - talk to your peers
  - talk to your supervisor
- If the software isn't working then email me
  - (unless you are using Internet Explorer)