

# UNIVERSITY OF CAMBRIDGE COMPUTER LABORATORY

## First-Year Computer Science

### Practical Class — Week 2

This document incorporates the Guided Practical Session for this week, Week 2, which leads to Tick 2. It also incorporates an outline of what is required for Tick 3. Additionally, this document describes the arrangements for the assessed practical work from Week 3 until the end of the Michaelmas Term.

#### The Wednesday 5 pm Deadline

From Week 3, everyone will be allocated a Ticker, someone who will assess the exercises and offer advice. An appended schedule shows who are *odds* and who are *evens* and who has which Ticker. It also provides a timetable of appointments for this term.

Tickers are advised that anyone who arrives at the scheduled time for an appointment has absolute priority. If your Ticker is attending to someone else at your appointed time please, politely, make your presence known.

From Week 3 (for the *odds*) and Week 4 (for the *evens*), the work set for a given week must be completed by 5 pm on the Wednesday before the Thursday class. This will give the Tickers an evening and a morning to check the work.

#### The Blue Racks

On a table in The Street of the William Gates Building, near the Student Administration Office, there is a table on which you will see a stack of blue letter-racks. There is one rack for each Ticker and labels indicate which rack is which. Each completed exercise must be placed in the appropriate rack by the Wednesday deadline.

#### Thursday Afternoon Debriefings in the Intel Laboratory

Next day, on Thursday afternoon, each *odd* (or each *even*) must go to the Intel Laboratory, at the time shown on the schedule, for a  $7\frac{1}{2}$  minute debriefing. There is plenty of space so *walk straight in* even if the appointment is some time off!

At this debriefing, the Ticker will discuss the work, ask a few questions about it, point out any inelegances and (almost always) initial the work and issue a Tick. It is essential to check the initialling (a Ticker may need reminding!) and to keep the initialled work.

#### Required Format of Submitted Work

The Tickers will insist that the layout of the work to be assessed conforms to a particular format. The Guided Practical Session for this week, Week 2, begins overleaf and shows how the required format should be applied this time to secure Tick 2.

## ML Guided Practical Session – Week 2

### Getting Started

- Log in to the PWF.
- Close the motd-Notepad window.
- Click start.
- Click Programs.
- Open Accessories.
- Open Notepad.
- Key in the following ML source text making sure that it is exactly as shown here but with your own name in line 1:

```
(* ML ASSESSED EXERCISES. TICK 2 SUBMISSION FROM F.H. KING. *)
(* Estimated time to complete: 10 mins. Actual time: 25 mins. *)

(* PROBLEM 1. The area of a triangle with base x and height y ... *)
fun area(x,y) = x*y/2.0;

(* PROBLEM 2. Two to the power of n ... *)
fun two2the(n) = if n = 0 then 1 else 2 * two2the(n-1);
```

- Choose Save As from the File menu.
- In the File name box, overwrite \*.txt with Tick2.
- Click Save.
- Click the Minimize button

### Testing the ML source

- Return to Programs.
- Open Teaching Packages.
- Open Computer Laboratory.
- Start Cambridge ML.

- Choose Read from the File menu.

From the List files of type drop-down list box, select All files (\*.\*) ; the list of files which appears probably includes `Tick1.LOG` which you created last week (the `.LOG` extension was added automatically by CML) and `Tick2.txt` which you have just created (the `.txt` extension was added automatically by Notepad).

- Double-click `Tick2.txt` to open it.
- Check that you have the ML use command

```
use "U:\\Tick2.txt";
```

- Press ENTER.

If there is an error message you will have to click `Tick2.txt - Notepad` in the Task Bar at the foot of the screen, edit the ML source, then choose the Read command from the File menu again

- Before each of the following test calls of the functions, press ENTER to ensure that there are vertical gaps separating adjacent tests:

```
area(3.5, 4.0); then area(3,4); then  
two2the(0); then two2the(5); then two2the(10);
```

- When everything seems to work choose Save As from the File menu.
- Save the ML session as `Tick2`
- Exit from CML.

### Looking at the files created so far

- Double-click the icon representing your documents on PWF Drive U; the system should show `Tick1` and *two* files called `Tick2`. All these files have a Notepad icon but notice the extensions: `Tick1.LOG` and `Tick2.LOG` were created in CML and `Tick2.txt` in Notepad.

### Tidying up and printing

- Remembering that all these files have a Notepad icon, double-click `Tick2.LOG` to enter Notepad.
- Tidy up the text and add a new line at the top with your own name so that it looks as closely as possible like the version shown on the next page:

TICK 2 SUBMISSION FROM F.H. KING...

FAM CML started on 27-Sep-2011 15:20:48

(version 4.2.00 of Sep 23 1994)

Image file Y:\cml\CML.EXP

(written on 29-Aug-1994 16:25:54 by FAM version 4.2.00)

[Loading Foreign Heap (Converting for Generic Use)]

Edinburgh ML for DOS/Win32s/Unix (C) Edinburgh University & A C Norman

```
- use "U:\\Tick2.txt";
> () : unit
[Opening U:\\Tick2.txt]
> val area = Fn : (real * real) -> real
> val two2the = Fn : int -> int
[Closing U:\\Tick2.txt]
-
- area(3.5, 4.0);
> 7.0 : real
-
- area(3,4);
Type clash in: (area (3,4))
Looking for a: real
I have found a: int
-
- two2the(0);
> 1 : int
-
- two2the(5);
> 32 : int
-
- two2the(10);
> 1024 : int
-
```

- Print this.
- Save the changes made to Tick2.LOG
- Open Tick2.txt
- Print the ML source.
- Exit from Notepad.
- Collect your output.
- Log off from the PWF and take *both* sheets to the Ticker for signature. The ML source text should be *on top of* the short ML session.

## Observations about Layout

The following notes list essential features of the format of the two-part submissions required for all the ML assessed exercises. The Guided Practical Session for Week 2 given above serves as an illustration. The outline of what it is hoped will be submitted for Tick 3 (in Week 3 or in Week 4) is given on the following two pages and serves as another illustration.

- There should be two parts to each submission, a file containing ML source text and comments, and a file containing a short ML session in which the functions in the file are tested. The source file should contain only comments and functions, no tests.
- The ML source text should begin with at least two comments. The first should indicate the number of the Tick and the name of whoever is submitting the work. The second should show the time estimated to complete the problem and the time actually taken.
- Within the ML source text, each problem should be introduced by a comment which indicates the number of the problem.
- Answers are of two kinds. Some should be presented as ML functions and others should be presented as a few lines of explanation wrapped up as a comment. Examples of such explanations are shown in the outline ML source for Tick 3 overleaf.
- Edit in the identification line at the top of the session file and add plenty of blank lines to make a generally tidy appearance. It is permissible to edit out some of the verbosity of error messages which in any case may vary slightly from those shown.
- Submissions must be securely fastened together with the ML source text *on top of* the short ML session (use staples not paper-clips).

Please adhere to these observations closely!

```
(* ML ASSESSED EXERCISES. TICK 3 SUBMISSION FROM F.H. KING. *)
(* Estimated time to complete: 30 mins. Actual time: 1 hour. *)
```

```
(* Note that in all three solutions, it is assumed that any
list presented as an argument is of adequate length.
Exceptions are not caught. *)
```

```
(* PROBLEM 1. A function last(...) *)
```

```
fun last xs = .....
```

```
(* It is accepted that last[] fails *)
```

```
(* PROBLEM 2. A function butLast(...) *)
```

```
fun butLast(xs) = .....
```

```
(* It is likewise accepted that butLast[] fails *)
```

```
(* PROBLEM 3. A function nth(...) *)
```

```
fun nth(xs,n) = .....
```

```
(* It is also accepted that nth([3,5],2) fails *)
```

TICK 3 SUBMISSION FROM F.H. KING...

FAM CML started on 06-Sep-2010 10:21:27

(version 4.2.00 of Sep 23 1994)

Image file Y:\cml\CML.EXP

(written on 29-Aug-1994 16:25:54 by FAM version 4.2.00)

[Loading Foreign Heap (Converting for Generic Use)]

Edinburgh ML for DOS/Win32s/Unix (C) Edinburgh University & A C Norman

```
- use "U:\\Tick3.txt";
> () : unit
[Opening U:\\Tick3.txt]
> val last = Fn : ('a list) -> 'a
> val butLast = Fn : ('a list) -> ('a list)
> val nth = Fn : (('a list) * int) -> 'a
[Closing U:\\Tick3.txt]
-
- val pie = [3,1,4,1,5,9];
> val pie = [3,1,4,1,5,9] : int list
-
-
- last pie;
> 9 : int
-
- last[];
Exception: Tl raised
-
-
- butLast pie;
> [3,1,4,1,5] : int list
-
- butLast[4];
> [] : int list
-
- butLast[];
Exception: Tl raised
-
-
- nth (pie, 4);
> 5 : int
-
- nth (pie, 6);
Exception: Hd raised
-
-
```

## Plagiarism

Learning from one another can be just as important as studying the material presented in lectures. It is both inevitable and acceptable that the first-year assessed exercises will be discussed by those who have to work through them. By contrast, simply copying one another's submissions is not acceptable and the University has stringent rules on plagiarism.

At the debriefing sessions, the Tickers routinely ask questions that test the submitters' understanding of the work submitted. If you submit an ML program that you have thought about, keyed in, and thoroughly tested yourself, you will have no difficulty answering these questions.

## Re-Submission

Once in a while, a Ticker may ask for a submission to be improved. In such a case, the revised version should be put in the appropriate rack before your next ticking session together, of course, with the scheduled submission for that week. It is most unusual to require more than one re-submission to secure a Tick.

## Hardware Practical Work — Paper 2 Candidates only

An appended schedule shows who has been allocated to which Hardware practical class. In the Michaelmas Term, the *odds* who see their Tickers in odd weeks have Hardware practicals in even weeks and the *evens* have Hardware practicals in odd weeks. The first Hardware practicals are on the Thursdays of Week 3 and Week 4.

Each CST candidate will have three Hardware practicals in the Michaelmas Term and four in the Lent. One assessed experiment is undertaken at each practical and seven ticks are gained in all for Hardware.

## Lent Term — Java Practical Classes — All Candidates

An appended schedule shows who has been allocated to which Java practical class. Each Thursday in the Lent Term there is a Java class that runs from from 2 pm to 4 pm followed by another class that runs from 4 pm to 6 pm.

Computer Science candidates who have morning Hardware classes will be allocated to the 2 pm to 4 pm Java class and those who have afternoon Hardware classes will finish in time for the Java class that runs from 4 pm to 6 pm.

Note that everyone has a two-hour Java practical class *every week*. The outline plan for each class is:

- Work through a Java handout.
- Embark on the associated exercise.
- Secure a tick for the previous week's exercise.

Exercises will be submitted in a way which will be described in the Java handouts. The allocation of Tickers (as in A, B, C or D) is the same as in the Michaelmas Term.

Tickers A and B will attend the 2 pm to 4 pm Java classes and Tickers C and D will attend the 4 pm to 6 pm Java classes. During the classes, the Tickers will visit their clients



rather than the other way round. The approximate assessment times are indicated on the schedule as offsets from the start times of the practical classes.

The first Lent Term practical class is special in that there is no immediately previous week. In this first week, the Tickers will assess the sixth ML exercise.

The last Lent Term practical class is also special in that no Java exercise will be set that week.

### **Arrangements for the Easter Term**

There will be no practical classes in the Easter Term when the time thereby gained can usefully be spent on revision.

### **The Computer Laboratory Web Site**

It is essential to be familiar with the Computer Laboratory web site whose home page is to be found at:

<http://www.cl.cam.ac.uk>

Most of the information you are likely to find immediately useful is accessed by clicking Information for Current students.

This link brings up a page which incorporates further useful links. Note, particularly, Teaching course material and links under the section headings Examinations and Lecture timetables. One of the links under Examinations is Formal notices about the examinations. Clicking this brings up a page which contains links to numerous formal documents relating to the Computer Science Tripos.

Among these documents are the Head of Department's Announcements which were issued in Week 1. Those who are interested in the minutiae of the examination arrangements might try the link to the Marking Scheme and Classing Convention document.

### **Two Marks Per Tick**

In the Tripos Examination at the end of the year, the published mark for each written paper is out of 80 marks and the associated practical work accounts for another 20 marks. Each assessed exercise leads to a single Tick. Ten Ticks are associated with Paper 1 and another ten are associated with Paper 2.

In consequence, each Tick counts as two raw marks. Fractions of Ticks are not awarded so, for each exercise, you score either two marks or no marks.

Sometimes it is suggested that it is unsound to reward a barely-acceptable submission with the same mark as a highly polished product. This policy is intended to discourage candidates from making endless time-consuming refinements in the hope of gaining a marginally better assessment.

It should also be noted that a strong candidate who produces an acceptable submission in one hour gains time over a weak candidate who takes four hours. This gain translates into extra study time and ultimately into better performance on the written papers.

F.H. King  
13 October 2011

# ML TICKING SESSIONS — MICHAELMAS TERM THURSDAYS IN 2011–12

The Odd-Thursdays Groups — Weeks 1, 2, 3, 5, and 7

## Demonstrators and Times

Time	Ticker A	Ticker B	Ticker C	Ticker D
2:00	Allbless, O.D. <sup>p</sup>	Doble, R.T.B. <sup>p</sup>	Ainsworth, S. <sup>o</sup>	Kohler, T.X.J. <sup>x</sup>
2:07½	Askew, D.T. <sup>p</sup>	Dorrity, R. <sup>p</sup>	Badev, R. <sup>o</sup>	Kongsuwan, N. <sup>x</sup>
2:15	Bean, C.S. <sup>x</sup>	Edgecombe, G.P. <sup>p</sup>	Bateson, J.D. <sup>o</sup>	Lee, C.H.J. <sup>o</sup>
2:22½	Birch, O.E. <sup>x</sup>	Eksinchol, I. <sup>x</sup>	Chadwick, A.W. <sup>o</sup>	Lee, Y. <sup>o</sup>
2:30	Blake, D.J.J. <sup>p</sup>	Ermatov, A. <sup>x</sup>	Cook, S.R. <sup>o</sup>	Leith, I.A. <sup>x</sup>
2:37½	Boby, T. <sup>p</sup>	Evans, C.G. <sup>x</sup>	Daggitt, M.L.D. <sup>o</sup>	Li, H.Y. <sup>x</sup>
2:45	Broder-Rodgers, D.J. <sup>x</sup>	Freeman, O.C.B. <sup>p</sup>	Dziedzic, K. <sup>o</sup>	Lin, D. <sup>o</sup>
2:52½	Brouwer, T.A. <sup>p</sup>	Gates, N.J. <sup>p</sup>	Elliott, B.G. <sup>o</sup>	Luo, J. <sup>o</sup>
3:00	Burgess, C.H. <sup>x</sup>	Gopinath, S. <sup>x</sup>	Funk, S.F.F. <sup>o</sup>	Malz, D.H. <sup>x</sup>
3:07½	Collins, T. <sup>x</sup>	Goudarzi, M.M. <sup>x</sup>	Harradine, K. <sup>x</sup>	Markovic, O. <sup>x</sup>
3:15	Cox, C.I. <sup>p</sup>	Green, A.P. <sup>x</sup>	Huxtable, M.J. <sup>x</sup>	McAulay, J.D.D. <sup>o</sup>
3:22½	Cox, M.L. <sup>x</sup>	Hambling, H.V. <sup>x</sup>	Ingram, M.D. <sup>x</sup>	McDermott, S.J. <sup>x</sup>
3:30	Dao, T.N. <sup>p</sup>	Hettich, M. <sup>p</sup>	Ireland, M.T. <sup>p</sup>	McNicol, C. <sup>x</sup>
3:37½	Deasy, C.F. <sup>p</sup>	Hodge, C.L. <sup>p</sup>	Kay-Coles, E.J. <sup>p</sup>	Mizera, S.A. <sup>x</sup>
3:45	Denes, G. <sup>p</sup>	Hollingshead, S.J. <sup>p</sup>	Kispeter, T. <sup>o</sup>	Muirhead, J.R. <sup>x</sup>
3:52½	Dior, L.F. <sup>x</sup>	Huang, V. <sup>p</sup>	Kitching, C.D. <sup>p</sup>	Muszynska, E.M. <sup>x</sup>

# ML TICKING SESSIONS — MICHAELMAS TERM THURSDAYS IN 2011–12

The Even-Thursdays Groups — Weeks 1, 2, 4, 6, and 8

## Demonstrators and Times

Time	Ticker A	Ticker B	Ticker C	Ticker D
2:00	Kirkbride, A.B. <sup>p</sup>	Revere, D. <sup>x</sup>	McCarthy, T.M.J. <sup>o</sup>	Strodahs, A. <sup>x</sup>
2:07½	Liang, G. <sup>p</sup>	Ryda, J. <sup>x</sup>	Mikhno, V. <sup>o</sup>	Tataranu, V.-B. <sup>o</sup>
2:15	Manyakin, I. <sup>p</sup>	Sharkey, J.P. <sup>x</sup>	Millican, J.R. <sup>o</sup>	Taylor, T. <sup>x</sup>
2:22½	Marshall, A.J. <sup>p</sup>	Sheriff, A.D. <sup>p</sup>	Osis, F. <sup>o</sup>	Tchernev, I.S. <sup>x</sup>
2:30	McCusker, W.S. <sup>p</sup>	Shore, A.C.G. <sup>p</sup>	Polasek, J. <sup>o</sup>	Truscott, M.A. <sup>x</sup>
2:37½	Miller, T.C. <sup>p</sup>	Shukla, A. <sup>p</sup>	Popov, D.P. <sup>o</sup>	Turcu, T.C. <sup>x</sup>
2:45	Myatt, C.G. <sup>p</sup>	Singh, K.M. <sup>x</sup>	Powell, T.S. <sup>o</sup>	Varga, C.F. <sup>x</sup>
2:52½	Naydenov, M.N. <sup>x</sup>	Sklyarov, A. <sup>x</sup>	Ronecker, P.R. <sup>o</sup>	Vecerik, M. <sup>x</sup>
3:00	Nelson, A.E. <sup>x</sup>	Skramic, M. <sup>x</sup>	Saperstein, C.M. <sup>o</sup>	Venus, B.J. <sup>x</sup>
3:07½	Nipps, S.G. <sup>p</sup>	Sood, A. <sup>p</sup>	Satra, N.S. <sup>o</sup>	Wainwright, B.G. <sup>x</sup>
3:15	Orton, R.I. <sup>p</sup>	Srivastava, A. <sup>x</sup>	Scbior, A.M. <sup>o</sup>	Wannerberg, E.O.J. <sup>x</sup>
3:22½	Pattinson, L.T. <sup>x</sup>	Stansby, D.A. <sup>x</sup>	Stankovic, A. <sup>o</sup>	Warder, S.C. <sup>x</sup>
3:30	Peake, D.B.B. <sup>p</sup>	Tataroiu, B.-C. <sup>p</sup>	Stedman, J.J.H. <sup>x</sup>	Wheelhouse, C.R. <sup>p</sup>
3:37½	Penington, G.R. <sup>x</sup>	Taylor, J.M. <sup>p</sup>	Stewart, B. <sup>x</sup>	Williams, O. <sup>p</sup>
3:45	Phatpanichot, K. <sup>p</sup>	Vadera, M.B. <sup>p</sup>	Stojanovic, S. <sup>o</sup>	Wyatt, B.J.Y.C. <sup>p</sup>
3:52½	Rees, N. <sup>x</sup>		Stoyanov, S.I. <sup>o</sup>	

# HARDWARE PRACTICALS — MICHAELMAS TERM THURSDAYS IN 2011–12

Even Thursdays 10:30	Even Thursdays 13:30	Odd Thursdays 10:30	Odd Thursdays 13:30
Allbless, O.D. <sup>p</sup> Askew, D.T. <sup>p</sup> Blake, D.J.J. <sup>p</sup> Bobby, T. <sup>p</sup> Brouwer, T.A. <sup>p</sup> Cox, C.I. <sup>p</sup> Dao, T.N. <sup>p</sup> Deasy, C.F. <sup>p</sup> Denes, G. <sup>p</sup> Doble, R.T.B. <sup>p</sup> Dorrity, R. <sup>p</sup> Edgecombe, G.P. <sup>p</sup> Freeman, O.C.B. <sup>p</sup> Gates, N.J. <sup>p</sup> Hettich, M. <sup>p</sup> Hodge, C.L. <sup>p</sup> Hollingshead, S.J. <sup>p</sup> Huang, V. <sup>p</sup>	Ainsworth, S. <sup>o</sup> Badev, R. <sup>o</sup> Bateson, J.D. <sup>o</sup> Chadwick, A.W. <sup>o</sup> Cook, S.R. <sup>o</sup> Daggitt, M.L.D. <sup>o</sup> Dziedzelis, K. <sup>o</sup> Elliott, B.G. <sup>o</sup> Funk, S.F.F. <sup>o</sup> Ireland, M.T. <sup>p</sup> Kay-Coles, E.J. <sup>p</sup> Kispeter, T. <sup>o</sup> Kitching, C.D. <sup>p</sup> Lee, C.H.J. <sup>o</sup> Lee, Y. <sup>o</sup> Lin, D. <sup>o</sup> Luo, J. <sup>o</sup> McAulay, J.D.D. <sup>o</sup>	Kirkbride, A.B. <sup>p</sup> Liang, G. <sup>p</sup> Manyakin, I. <sup>p</sup> Marshall, A.J. <sup>p</sup> McCusker, W.S. <sup>p</sup> Miller, T.C. <sup>p</sup> Myatt, C.G. <sup>p</sup> Nipps, S.G. <sup>p</sup> Orton, R.I. <sup>p</sup> Peake, D.B.B. <sup>p</sup> Phatpanichot, K. <sup>p</sup> Sheriff, A.D. <sup>p</sup> Shore, A.C.G. <sup>p</sup> Shukla, A. <sup>p</sup> Sood, A. <sup>p</sup> Tataroiu, B.-C. <sup>p</sup> Taylor, J.M. <sup>p</sup> Vadera, M.B. <sup>p</sup>	McCarthy, T.M.J. <sup>o</sup> Mikhno, V. <sup>o</sup> Millican, J.R. <sup>o</sup> Osis, F. <sup>o</sup> Polasek, J. <sup>o</sup> Popov, D.P. <sup>o</sup> Powell, T.S. <sup>o</sup> Ronecker, P.R. <sup>o</sup> Saperstein, C.M. <sup>o</sup> Satra, N.S. <sup>o</sup> Scibior, A.M. <sup>o</sup> Stankovic, A. <sup>o</sup> Stojanovic, S. <sup>o</sup> Stoyanov, S.I. <sup>o</sup> Tataranu, V.-B. <sup>o</sup> Wheelhouse, C.R. <sup>p</sup> Williams, O. <sup>p</sup> Wyatt, B.J.Y.C. <sup>p</sup>

# JAVA PRACTICAL CLASSES — LENT TERM THURSDAYS IN 2011–12

Time Offset	2 p.m. to 4 p.m. Ticker A	2 p.m. to 4 p.m. Ticker B	4 p.m. to 6 p.m. Ticker C	4 p.m. to 6 p.m. Ticker D
0.00	Allbless, O.D. <sup>p</sup> Askew, D.T. <sup>p</sup> Bean, C.S. <sup>x</sup> Birch, O.E. <sup>x</sup> Blake, D.J.J. <sup>p</sup> Boby, T. <sup>p</sup> Broder-Rodgers, D.J. <sup>x</sup> Brouwer, T.A. <sup>p</sup> Burgess, C.H. <sup>x</sup> Collins, T. <sup>x</sup> Cox, C.I. <sup>p</sup> Cox, M.L. <sup>x</sup> Dao, T.N. <sup>p</sup> Deasy, C.F. <sup>p</sup> Denes, G. <sup>p</sup> Dior, L.F. <sup>x</sup> Kirkbride, A.B. <sup>p</sup> Liang, G. <sup>p</sup> Manyakin, I. <sup>p</sup> Marshall, A.J. <sup>p</sup> McCusker, W.S. <sup>p</sup> Miller, T.C. <sup>p</sup> Myatt, C.G. <sup>p</sup> Naydenov, M.N. <sup>x</sup> Nelson, A.E. <sup>x</sup> Nipps, S.G. <sup>p</sup> Orton, R.I. <sup>p</sup> Pattinson, L.T. <sup>x</sup> Peake, D.B.B. <sup>p</sup> Penington, G.R. <sup>x</sup> Phatpanichot, K. <sup>p</sup> Rees, N. <sup>x</sup>	Doble, R.T.B. <sup>p</sup> Dorrity, R. <sup>p</sup> Edgecombe, G.P. <sup>p</sup> Eksinchol, I. <sup>x</sup> Ermatov, A. <sup>x</sup> Evans, C.G. <sup>x</sup> Freeman, O.C.B. <sup>p</sup> Gates, N.J. <sup>p</sup> Gopinath, S. <sup>x</sup> Goudarzi, M.M. <sup>x</sup> Green, A.P. <sup>x</sup> Hambling, H.V. <sup>x</sup> Hettich, M. <sup>p</sup> Hodge, C.L. <sup>p</sup> Hollingshead, S.J. <sup>p</sup> Huang, V. <sup>p</sup> Revere, D. <sup>x</sup> Ryda, J. <sup>x</sup> Sharkey, J.P. <sup>x</sup> Sheriff, A.D. <sup>p</sup> Shore, A.C.G. <sup>p</sup> Shukla, A. <sup>p</sup> Singh, K.M. <sup>x</sup> Sklyarov, A. <sup>x</sup> Skramic, M. <sup>x</sup> Sood, A. <sup>p</sup> Srivastava, A. <sup>x</sup> Stansby, D.A. <sup>x</sup> Tataroiu, B.-C. <sup>p</sup> Taylor, J.M. <sup>p</sup> Vadera, M.B. <sup>p</sup>	Ainsworth, S. <sup>o</sup> Badev, R. <sup>o</sup> Bateson, J.D. <sup>o</sup> Chadwick, A.W. <sup>o</sup> Cook, S.R. <sup>o</sup> Daggitt, M.L.D. <sup>o</sup> Dziedzelis, K. <sup>o</sup> Elliott, B.G. <sup>o</sup> Funk, S.F.F. <sup>o</sup> Harradine, K. <sup>x</sup> Huxtable, M.J. <sup>x</sup> Ingram, M.D. <sup>x</sup> Ireland, M.T. <sup>p</sup> Kay-Coles, E.J. <sup>p</sup> Kispeter, T. <sup>o</sup> Kitching, C.D. <sup>p</sup> McCarthy, T.M.J. <sup>o</sup> Mikhno, V. <sup>o</sup> Millican, J.R. <sup>o</sup> Osis, F. <sup>o</sup> Polasek, J. <sup>o</sup> Popov, D.P. <sup>o</sup> Powell, T.S. <sup>o</sup> Ronecker, P.R. <sup>o</sup> Saperstein, C.M. <sup>o</sup> Satra, N.S. <sup>o</sup> Scibior, A.M. <sup>o</sup> Stankovic, A. <sup>o</sup> Stedman, J.J.H. <sup>x</sup> Stewart, B. <sup>x</sup> Stojanovic, S. <sup>o</sup> Stoyanov, S.I. <sup>o</sup>	Kohler, T.X.J. <sup>x</sup> Kongsuwan, N. <sup>x</sup> Lee, C.H.J. <sup>o</sup> Lee, Y. <sup>o</sup> Leith, I.A. <sup>x</sup> Li, H.Y. <sup>x</sup> Lin, D. <sup>o</sup> Luo, J. <sup>o</sup> Malz, D.H. <sup>x</sup> Markovic, O. <sup>x</sup> McAulay, J.D.D. <sup>o</sup> McDermott, S.J. <sup>x</sup> McNicol, C. <sup>x</sup> Mizera, S.A. <sup>x</sup> Muirhead, J.R. <sup>x</sup> Muszynska, E.M. <sup>x</sup> Strodahs, A. <sup>x</sup> Tataranu, V.-B. <sup>o</sup> Taylor, T. <sup>x</sup> Tchernev, I.S. <sup>x</sup> Truscott, M.A. <sup>x</sup> Turcu, T.C. <sup>x</sup> Varga, C.F. <sup>x</sup> Vecerik, M. <sup>x</sup> Venus, B.J. <sup>x</sup> Wainwright, B.G. <sup>x</sup> Wannerberg, E.O.J. <sup>x</sup> Warder, S.C. <sup>x</sup> Wheelhouse, C.R. <sup>p</sup> Williams, O. <sup>p</sup> Wyatt, B.J.Y.C. <sup>p</sup>
0.15				
0.30				
0.45				
1.00				
1.15				
1.30				
1.45				
2.00				









