



Effective Assessments – Computing for Scientists

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**Teaching Computation
With MATLAB®**



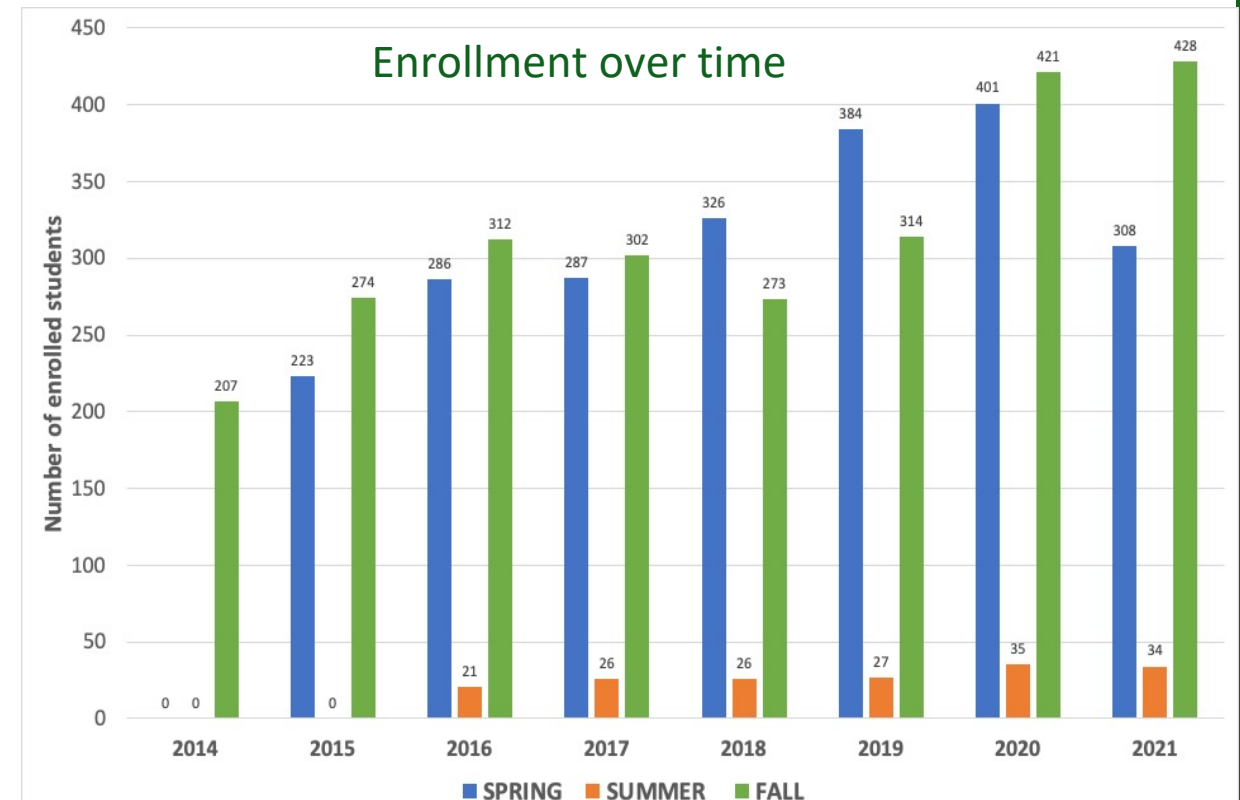
Mason is the largest public research university in Virginia

- Located in Fairfax, Va., 15 miles from Washington, D.C.
- 39,000 students
- Students from 130 countries, 50 states
- 78 undergraduate programs, 95 master's, 38 doctoral, law
- *Times Higher Education*: Best U.S. university under 50 years old
- *A Money* “best value” college



CDS 130 – Computing for Scientists

- Introductory course in **Computational Thinking**, which meets the **MASON Core** requirements for **Information Technology and Ethics**.
- Students look at problems by identifying the data involved, identify the mathematical processes needed, and produce information to answer the problem being asked.
 - Raw data and problems → information and understanding.
- Three main components
 - Ethics, Computational Thinking, MATLAB programming skills
 - Course structure
 - **Week 1 to 5** –Introduction to computer programming and computational science
 - **Week 6 to 10** – Modelling
 - **Week 11 to 15** – Advanced applications



Our Students

- About 80% have little to no programming experience.
- Those that have done computer programming before.
 - MATLAB (8%), Python (13%), R (12%), C/C++ (7%).
- About 90% of students have little to no experience in a non-scientific programming language (e.g., HTML, CSS, .NET, Shell,...).
- About 92% of students feel confident in their computer literacy skills.
- Students come from ALL DISCIPLINES at GMU.
- Estimated average grade as of current, B+

| | | | |
|----|---------------|----|---------------|
| A+ | > 97.00 | C+ | 77.00 - 79.99 |
| A | 93.00 - 96.99 | C | 73.00 - 76.99 |
| A- | 90.00 - 92.99 | C- | 70.00 - 72.99 |
| B+ | 87.00 - 89.99 | D+ | 67.00 - 69.99 |
| B | 83.00 - 86.99 | D | 60.00 - 66.99 |
| B- | 80.00 - 82.99 | F | <60.00 |

How do we do it? – Scaffolded exercises

Your Turn Exercises

VIDEO: Ch 8 (Part B) - Iteration #1: FOR Loops

Enabled: Review

Attached Files: CDS-130 I2M Ch 8 B v1 transcript.txt (3.483 KB)

CDS-130 I2M Ch 8 B v1 (04:57)



[The transcript for this video is attached. This video covers Chapter 8 .pptx/pdf file slides 11-19]

YOUR TURN Exercise: I2M Ch 8 (for Parts A/B)

For these YOUR TURN Exercises, what values will print out when run?

Study aid videos

List of Chalk Talks and Handouts

Open in new tab: CDS130-graphicListOfChalktalksAndHandout.html

Category: Week 3, 4 - MATLAB Vectors
More: (Part 2) (Part 3)

Extending the length of a vector

Type: video
Category: Week 3, 4 - MATLAB Vectors
More: n/a

Creating Vectors using FOR loops

Type: pptx
Category: Week 4 - MATLAB Vectors
More: n/a

Practice problems for assignments, quizzes & exams

Question 2

You have a bag of marbles that contains: 11 red, 7 yellow, 16 green, 9 blue. You put your hand into the bag and draw a marble at random, and repeat this 1 time.

What is the probability that you choose a **yellow** marble on the first 'draw', and then a **green** marble on the 2nd draw, and then a **yellow** reflect the possible outcomes of the draws in the correct order.

Selected Answer: $(7/43 + 16/42 + 6/41) / 3$

Answers: $(7/43 + 16/42 + 6/41) / 3$

$7/43 + 16/43 + 7/43$

$7/43 * 16/42 * 7/43$

$7/43 * 16/43 * 7/43$

$7/43 + 16/42 + 6/41$

Response Feedback:

Draw 1: There are 7 yellow in a total of 43. With replacement, total remains 43 after the draw.
Draw 2: There are 16 green in a total of 43. With replacement, total remains 43 after the draw.
Draw 3: There are 7 yellow in a total of 43. With replacement, total remains 43 after the draw.

Midweek and Weekly assignments

Week #5-at-a-Glance

Enabled: Review

Print

Close Week #5 : Sun, September 19 - Sat, September 25 (open on Wed, September 15)

| Materials for Week #5: | Note |
|--|---------------------------------|
| Ethics Lessons: <ul style="list-style-type: none">• Passwords: Use 'em or loose 'em | |
| Introduction to MATLAB Programming and Basic Computational Skills Lessons: <ul style="list-style-type: none">• I2M Ch 10 Conditionals - IF Statements | |
| Assignments Due During Week #5: | Complete by |
| • MWE05 | Wednesday Evening, September 22 |
| • Week #5 Ethics Assignment | Wednesday Evening, September 22 |
| • YTE Ch 10 A | Saturday Evening, September 25 |
| • YTE Ch 10 B | Saturday Evening, September 25 |
| • YTE Ch 10 C | Saturday Evening, September 25 |
| • WA05 | Saturday Evening, September 25 |
| Exam of Week #5: | Complete by |
| • Computer Check for RESPONDUS with Webcam | MONDAY, September 27 at 11:59am |
| • Stage #1 Exam with RESPONDUS Lockdown Browser with Webcam | (Noon Eastern US Time) |
| • Stage #1 Exam Scratch Paper Upload (required) | |

How do we do it?

Additional strategies

- Students must create pseudocode before starting major assignments
- Multiple Assessment attempts (except WA and exams)
- Assignment templates with sample problems
- Autograding for immediate feedback and showing corrections
- Individual student feedback for manually graded questions
- Assignments connected to real world applications

OUR SECRET WEAPON - STARS

| CDS 130 | | | | | |
|------------------|---------|--------------------------------------|--|---------------|----------|
| Ibraheem Bashsta | 1, 13 | Iasiello, Carmen & Almalki, Abdullah | M & W @ 5pm-6pm | (717)836-0191 | ibashata |
| Sabina Sheridan | | 1 Iasiello, Carmen | | | ssherid4 |
| Joe Dombroski | | 3 Romanelli, Ralph | T @ 1pm-2pm (RH 249) | (740)675-2323 | jdombro |
| Alessa Ogork | | 3 Romanelli, Ralph | M @ 10:20am-11:20am | (703)679-7459 | aogork |
| Vi Nguyen | | 5 Mahabir, Ron | R @ 1pm-2pm | (540)699-0459 | vnguye65 |
| Brianna Tilghman | 5, DL3 | Mahabir, Ron & Reese, Kris | W @ 4pm-6pm | (540)446-5383 | btighma |
| Benjamin Simmons | | 6 Slamanai, Adel | T & R @ 5pm-6pm | (703)249-9287 | bsimmon7 |
| Sofia Escoto | 9, 14 | Vo, Garret & Mahabir, Ron | R @ 12pm-1pm | (571)303-9718 | sescoto |
| James Bussey | 9, 13 | Vo, Garret & Almalki, Abdullah | W @ 5pm-6pm (RH 249) | (703)594-1096 | jbussey4 |
| Parker Niccum | | 10 Hui, Annie | T & W @ 10am-11am | (703)665-0142 | pniccum |
| Alannah Post | | 11 Hui, Annie | W @ 3pm-4pm (RH 249) & F @ 1:30pm-2:30pm | (540)680-4868 | apost7 |
| Kashmala Mahmood | 11, DL1 | Hui, Annie & Mahabir, Ron | T & R @ 3pm-5pm | (571)206-1542 | kmahmoo |
| Matthew Ritzo | | 12 Kennedy, William | T @ 12pm-1pm (RH 249) | (703)634-9314 | mritzo |
| Handan Karaman | | 12 Kennedy, William | R @ 12:30pm-1:30pm (RH 249) | (703)829-0361 | hkarama2 |
| Peter Shin | | 14 Mahabir, Ron | T @ 10am-11am | (703)688-3309 | pshin2 |
| Madison Hardesty | DL1 | Mahabir, Ron | M & T @ 12pm-2pm | (202)618-9284 | mhardest |
| Jennifer Vu | DL2 | Miller, Matthew | M & W @ 12pm-1pm | (571)207-5721 | jvu22 |
| Tiffany Vu | DL2 | Miller, Matthew | W @ 10pm-12am | (571)295-4493 | tvu23 |

Contact any section STAR

Thank you for your time

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