I. The scoring algorithm behind the Digital SAT

The 2024 Online Digital SAT incorporates a two-stage hybrid adaptive test format. This means that the score on the first module (mod1) of the Math component dictate whether the second mod the student gets is easy or hard. Each mod contains 22 questions (only 20 are scored – the other two are experimental to help design future tests). *The questions themselves are NOT adaptive BUT they are WEIGHTED.*

This version dramatically affects students who are either: (1) not prepared for the most difficult questions or (2) tend to be careless (due more to misreading then calculation). If the student makes it to mod2-hard, they may likely score between 700 – 800. Alternatively, mod2-easy may limit them to the 500 – 600 range. This is all due to the weighting algorithms.

In essence, if you don't move to mod2-hard your grade could result in a 200-point difference. This is a direct result of the combination of question weights and frequency of hard questions in mod2 hard versus easy.

A Plausible Explanation

College board not only does not publish their algorithms or weights (of questions). They may also change the weights and their distribution as data from previous test results become available. Therefore, we will present a hypothetical model which helps explain the importance of understanding the theory behind the algorithm.

Assumptions:

- Question Weights:
  - Difficult = 1.2
  - Medium = 1.0
  - Easy = 0.8
- Distribution of weighted questions mod1, mod2H and mod2E

    - Mod1: H = 7, M = 7, E = 6
    - Mod2.H: H = 12, M = 5, E = 3
    - Mod2.E: H = 3, M = 10, E = 7
- Percent Correct
    - Student A: H = 0.8, M = 0.9, E = 1.0
    - Student B: H = 0.6, M = 0.8, E = 0.9

Results: As reported in the simulation below. With both weighting and non-weighting, the scores are similar, but student A's total score would be in the high 700's while student B would be in the low to mid 500's. A two-hundred-point difference.

Therefore, the **primary objective** of this book and the associated software applications is to increase the odds of a student moving from:

Module 1 to Module 2 Hard

user inputs	factors	weights		mod 1 dist	mod 2 Hard	mod 2 easy		NON WEIGHTED	
Difficult	0.2	1.2		7	12	3			
Medium	1	1		7	5	10	raw score	H - range	E - range
Easy	0.2	0.8		6	3	7	26	580 - 640	430 - 490
factors are relative to medium							27	600 - 660	450 - 510
			% correct (as decimal)				28	610 - 670	460 - 520
			mod 1	mod 2	mod 2		29	630 - 690	470 - 530
	Group		difficult	medium	easy		30	640 - 700	490 - 550
	m2-H students		0.8	0.9	1		31	660 - 720	500 - 560
	m2-E students		0.6	0.8	0.9		32	680 - 740	520 - 580
							33	700 - 760	530 - 590
weighted			mod 1	mod 2	raw score	raw score	34	720 - 780	580 - 640
			raw scor	mod II Hard	Mod II Easy	tot mod I & II	35	740-800	540 - 620
	m2-H students		17.82	18.42	X	36.138	36	760 - 800	580 - 660
	m2-E students		14.96	X	15.2	30.1192	37	770 - 800	x
							38	780 - 800	x
non weighted			mod 1	mod 2	raw score	raw score	39	780 - 800	x
			raw scor	mod II Hard	Mod II Easy	tot mod I & II	40	780 - 800	x
	m2-H students		19.4	17.1	X	36.891			
	m2-E students		15.2	X	16.1	31.147			

It is essential that students focus on difficult problems and eliminate carelessness.