

Assignments that Meet the Needs of Exceptional Students without Disadvantaging the Average

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Introduction

Beginning students have dramatically different:

- ◆ Backgrounds
- ◆ Abilities / Strengths / Fears
- ◆ Interests / Talents
- ◆ Future directions

Can We Reach Them All?



A Solution: One Assignment with Variations

- “Base Assignment” is same for all
- Requirements can allow for variation and choice.



Variation 1: Levels of Completion

- (stages) can be described in the assignment specifications.
- Decide base (acceptable) requirements
 - ◆ What is “good enough”
- The rest are ‘embellishments’



A-B-C Requirements (Staged Solutions)

- Allows for more complex & interesting problems
- Clearly set out requirements
- Gives “choice” back to students
- ‘C’-level is within the range of all
- Can supply portions of code, and invite students to replace it
- Provides a means of describing a minimal acceptable solution



Student Reactions:

- Few complaints about marking
- Some will choose to complete 'C' requirements sometimes, and "go for the 'A'" other times
- Students complete the 'C'-level assignment and often opt to try for the 'B'
- Students often end up working harder – to get the extra credit



Example :



Example: Frogger

- **C Requirements** The minimal passable solution will have only a single Frog that moves correctly on the screen, 2 rows of Vehicles moving in opposite directions and one Home at the top. This solution is worth a maximum mark of C+
- **B Requirements** The midrange solution will have 3 Homes, 5 rows of Vehicles, and a working Frog who can move [jumping is bonus] and **ONE OF: two kinds of Critter, ---OR--- a Boulevard to rest on (with NO time limit)**, This solution is worth a maximum mark of B+

NOTE: having the frog ride river creatures properly (and not "slide" off) is BONUS and not part of the base requirements.

- **A Requirements** The best solution will have 5 Homes, 5 rows of Vehicles, one Frog, AND 5 rows of Critters all working correctly. It is worth up to an A The boulevard will have a time limit, [**BONUS: and the turtles must sometimes dive.**]
- **The "full-function" Frogger is Bonus.** It includes the girl Frog; Alligators whose mouths open, and snakes on logs and on the boulevard



Variation 2: Bonus Points

- Enhancements for all
- *EXTRA* to basic requirements
- Limited effect on grade
- Provides mechanism for rewarding **any** valid embellishments
- Even though a maximum of points used to affect final grade, some earn as many as they can
- ***It becomes like a game for some: to see how many points they can earn (prime# asst)***



Bonus Points: Frogger

- 1. [up to 6 points] Make a girl frog.
- 2. [up to 6 points] Make the alligator's mouth open.
- 3. [up to 10 points] Include the snakes.
- 4. [up to 10 points] Multiple (5) frogs per game. [homes can be occupied by only one frog]
- 5. [2-3 points] Detect "Game Over": when Frog dead; or when Frog gets across.
- 6. [2 points] Keep score.
- 7. [2-5 points, per level] Allow different levels of difficulty (different #'s of things, different ranges, etc.)
- 8. [2 points] Set up "key bindings" so player can use the arrow keys, etc.
- 9. [4-? points] Make it Interrupt Driven



Challenges

- Enhancements for the brightest
- Some are post-grad level
- Ideas for students
- Shows where the current project could lead

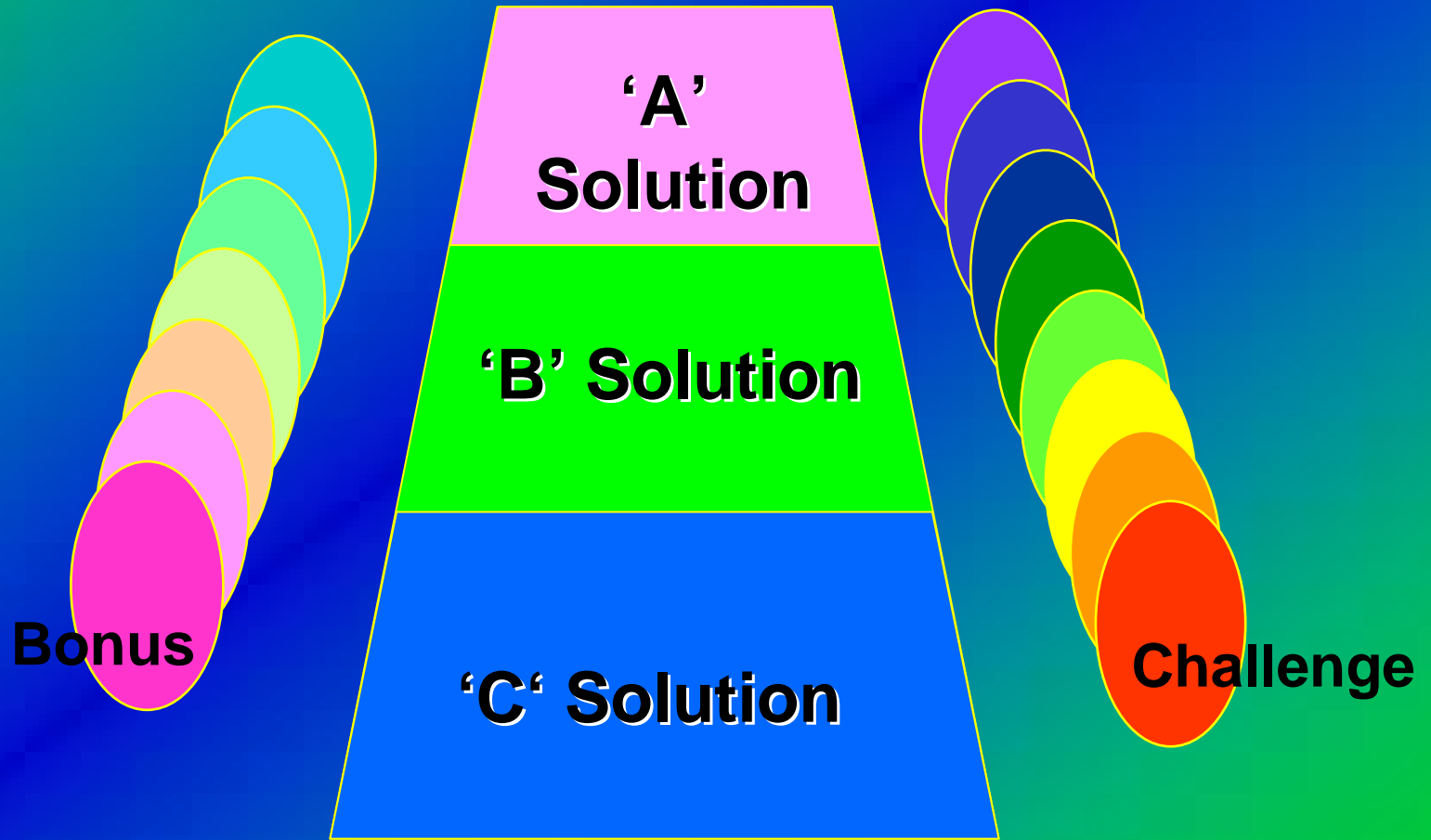


Challenge Points: Frogger

- 1. [4-? points] Add sound.
- 2. [4-? points] Create a full GUI
- 3. [5-? points] Do it in colour
- 4. [5-? points] 3-D



Assignment Specifications



Conclusions

- Gives both instructor and student greater flexibility
- Helps to clarify goals of assignment for all (instructor; student; marker)



Examples

- **Solitaire:**

- Calculation
- Canfield
- Four Seasons
- Double or Quits

- **Games:**

- Game of Life
- Minesweeper
- Battleship
- Asteroids!
- Space Invaders
- Centipede
- Frogger

- **Parsers:**

- Tiny Basic Interpreter
- Polish Postfix Converter
- Arithmetic Expression Parser
- Wee-English – Latin Translator

- **Encryption:**

- One-Time Pad
- Caesar Cypher
- Cyclic Pad
- Byte Reversal



Thank You.

