**SPECIFICATIONS FOR THE GAME OF AI42**

By: David Curry

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1. RULES
   1. The game will adhere is the standard rules of Texas 42 as defined by the book “Winning 42: Strategy and Lore of the National Game of Texas” by Dennis Roberson, 6th edition 2025
   2. Everything below this point in this specification should be considered as clarification for the AI42 computer game and NOT override the rules as specified above.
   3. Credit for the user interface (UI), graphics, windows, and general play goes to the WIN42 version 3.91 by Curtis Cameron <https://ccdominoes.com/>
   4. This AI42 game has three primary purposes. 1. Provide a clean, intuitive, and convenient game to pass the time. 2. Offer an unskilled player suggestions to improve bidding/play skills. All AI program suggestions should be designed to provide this. 3. Offer a challenging opponent to very experienced and skilled players.
   5. The game will be written in C# using the Unity environment to enable a 2D game screen field with ease of window scaling/placement, sprite placement and rotation, popup box and text scaling, color selection (windows, fonts, domino pips, domino, and windows). All based on the available screen resolution and size.
   6. The addition of ML-Agents is required to implement machine learning for continuous improvement of game play, bidding, and strategy. Human player positions and AI agent positions will be defined in the settings. These agents will act as AI player(s) where designated. Any AI player will automatically participate in the game as a human substitute. It will be required to draw dominos, evaluate its hand, bid accordingly, and then play with a suitable winning strategy. There can be 0 to 4 AI players selected in the settings. In the 4 AI player mode, the game will automatically play itself at an adjustable rate to learn and improve its skills. The AI agent will also monitor all human play to adapt and improve its skills.
   7. The recommended C# class files are as follows;
      1. StartupManager.cs – Initial game start up. Establishing the Bottom\_player, Left\_player, Top\_player, and Right\_player. play areas, visible name location, bidding text locations, Discard\_pile, Scoring, and Action bar locations. Loading defaults, retrieving previous game configurations, settings, names, etc. as determined in OptionsManager.cs. Defines and controls the top bar Menu and all sub-menu items with calls to other classes as required for menu activities.
      2. ProgramManager.cs – Primary source of game control. Other classes will be called as required during actual game play. Controls the periodic domino shuffle, player/AI draw, face up or down, pip color, domino back image, dealer and turn rotation, Human or AI player, the initial draw for dealer, dealer rotation, bidding, play turn, tracking dominos played and unplayed, game play, timing, etc.
      3. ScreenManager.cs – Controls the screen layout, placement of items, windows and text sizing, domino movement, and sprite movement, rotation, and parameters. Parameters are saved and restored in OptionsManager.cs.
      4. ScoringManager.cs – Evaluate the outcome of hands after they are played, track and increment the scores as required. Will also contain the visual scoring method (TICKS or ALL) and act accordingly. Also moves dominos to the discard pile, orders them correctly, and places them according to the US (bottom) and THEM (top) arrangement. It will show either all hands or only the previous two played hands based on the current game rules.
      5. RuleManager.cs – Source of the basic rules of play and any optional settings modifying or adding to these rules according to settings.
      6. Stats.cs – Maintain the statistics for each player by name. Pass this data as required to display in a popup window on the main screen. Allow for viewing and resetting the statistics for any player.
      7. AIManager.cs – Primary source of AI support parameters as required for basic play and learning. This data should be accessible for evaluation, saving, and restoration.
      8. OptionsManager.cs – Primary source of the game settings, defaults, options, and changes. It should also contain information on current player names, item colors, domino backs available and selected. The information in this file is provided to many other .cs files as required variables.
      9. AudioManager.cs – Primary source of the audio controls, settings, and files to play at various times. Provided in an .OGG format for compatibility with various operating systems. Refer to “Audio descriptions.txt” file for a description and use of the sounds.
      10. SaveManager.cs – Provides the resources for various actions related to saving and loading games.
      11. Non-cs files –
          1. AI42.exe (or as required by OS) – Primary game executable. Other libraries may be required by the OS. These will be installed by the selected installation utility.
          2. AI42Recent.42 – Name of the most recent game state file if it was exited unexpectedly. Used to restore an accidental exit or crashed game. Must be continuously maintained as the game progresses so a “Restore previous game?” can be achieved at startup. This is also the default game that is loaded at startup.
          3. AI42Default.42 – Contains the parameters to load a clean game state with all options set to defaults.
          4. AI42Saved.42 – Default name of a saved game state including all parameters required to load a game at the point in which it was saved. Can be overwritten after a confirmation prompt.
          5. (anyname).42 – All parameters required to load a game that was saved by the player. Used to transport game files between users.
          6. Stats.csv – Export of the current Stats.cs information in a comma separated format for importing to a spreadsheet. A menu item is required to generate the .csv
   8. The game will be compiled to run on Windows (computers and laptops), MacOS (Apple computers), Android (phones, tablets), IOS (Apple phones), Android for Kindle (Kindle Fire tablets) and be able to scale for each type and screen size.
   9. The game will use a 28 tile set of Double-6 dominoes. These should be implemented as 2D sprites and maintain the required attributes as the game evolves (recommendations; domino\_size (0.1 to 9.9), in\_play (bool), face\_down (bool), back\_logo (filename.ext), suit\_1 (0-6), suit\_2 (0-6), face\_image, total\_pips (0 to 12), domino\_basecolor (00h-FFh), domino\_highlightcolor (00h-FFh), domino\_highlight (bool), suit1\_pipcolor (00h-FFh), suit2\_pipcolor (00h-FFh), rotation (0, 90, 180, 270), istrump (bool), iscount (bool), countvalue (5 or 10)).
   10. Various domino base colors, pip colors, and background images can be selected in the settings menu. The other window area colors can also be set. The domino size scaling can either be set manually or follow the scaling of the windows as they are adjusted by the user.
   11. The basic AI42 game will play by the STRAIGHT-42 rules. Scoring will be 7 marks per game. The total points scoring method of 250 points per game is not implemented at this time.
   12. Other specialized variation games are detailed below and allowed in a recreational setting (non-tournament mode). Each of these can be individually enabled/disabled in the AI42 settings menu.
   13. AI42 can be played in either of two basic modes; RECREATIONAL or TOURNAMENT
   14. In RECREATIONAL play mode the STRAIGHT-42 rules and all variations defined below are permitted if enabled in the settings menus. A “RECREATIONAL Mode” setting can be enabled in AI42.
   15. In TOURNAMENT play mode STRAIGHT-42 is the only game allowed. A “TOURNAMENT Mode” setting can be enabled in AI42. This setting overrides the enabling/disabling of all variations and forces all play to be by the STRAIGHT 42 rules of the N42PA.
   16. Tournament rules are as defined by the National 42 Player’s Association. <https://n42pa.org/home/rules>
   17. The player positions as defined in the program variables are Bottom\_player (typically the human player), Left\_player (left opponent), Top\_player (partner), Right\_player (right opponent).
   18. Player names can be changed in the AI42 settings menu. When a player name is defined, it is also selected to be either Human or AI. The player name and type will provide the variable information for the field names (Bottom\_player, Left\_player, Top\_player, Right\_player) and be shown on the screen. The initial defaults for player names and type will be Bottom\_player: “David” (human), Left\_Player: “Glenda” (AI), Top\_Player: “Charlie” (AI), and Right\_Player: “June”.
   19. A selection for any player to ”AI” will automatically play (as if it were a human) using the rules, built-in logic, and any machine learning. The AI program logic can be enabled for any or all of the 4 players. Setting all four players to AI will allow the game to play itself. This may require reducing the PLAY SPEED setting to SLOW observe the play.
2. SKILL LEVELS
   1. Each player can be either human (external player) with a name, or AI automatically playing with logic. Each AI player’s skill level can individually adjusted from 1 (BEGINNER) to 10 (EXPERT) in the AI42 settings menu.
      1. AI SKILL LEVEL – At the 10 EXPERT skill setting, the AI42 will play with the full AI machine learning logic, program code variables, evaluation routines, statistics, probability, weighting, and introduce 0% errors. It will do its best to play perfectly. It will also be learning to play better. At lower skill settings below 10, it will proportionally introduce small random errors in the statistics, probability, variables, and parameter weighting to allow it to mimic human error in the bidding and domino play processes. It will always follow the rules, but may not always make the wisest bid or play the perfect domino in its hand. It may or may not select the best trump, lead a double, overbid its hand, add count, lead back a double, and it might make other illogical mistakes. The purpose is to introduce the ability for a human player to feel like he has a chance to beat the AI, or allow the other players to be AI and test his skill.
      2. The skill level is adjustable from 0% random errors (EXPERT) at a SKILL setting of 10 with the full AI skills. The SKILL can be adjusted in 1 increments down to 100% random errors (BEGINNER) at a SKILL setting 1. All rules will be followed, but many mistakes will probably occur. The default will be a SKILL setting of 9 indicating 10% random errors. It can be adjusted as required to achieve the desired level of imitating real human play. This setting will be maintained individually for each AI player until changed in the settings.
      3. AI LEARNING – The skill level of the AI should use machine learning routines and observation to always be learning and improving. The AI machine learning will watch every hand played (Human or AI) and try learn from it. It will continuously adjust its calculations, weighting, variable starting values, and more to become a more skilled player. These improvements are permanently imbedded in the new program code as it plays. The AI game play will get increasingly more skilled and become harder to beat the more it observes and plays. A game on a computer after 10,000 games played should be much more skilled than when it was initially installed. The only way to clear to the original AI skill level is to uninstall/reinstall the program. These weights and parameters are labelled and maintained in AIManager.cs and can be observed or saved as required.
3. GAME SETUP and GENERAL OVERVIEW
   1. 4 players will play each game (any player can be a human with a name or AI with a skill level to play automatically).
   2. Each player sits on one side of a square table.
   3. Players across from each other are called partners or a team. There are two sets of partners. They are named US (bottom/top) and THEM (left/right)
   4. The sets of partners are in opposition to each other. They are working together as a team to try to make their bid or set the opposition. Talking or any cheating is not allowed. No player knows what is in any other player’s hand (including the AI).
   5. If one of the partners wins the bid for anything between 30 and 41, that team will try to win (“catch”) all or most of the 7 rounds “tricks” in a hand (1 point for each trick, totaling 7 points), catch the three 5 count dominoes (0-5, 1-4, 3-2), or the two 10 count dominoes (4-6, 5-5). A total of 42 points (7+15+20) is available for every STRAIGHT-42 hand. The winning bid team is hoping to successfully meet or exceed the bid number and “make” their bid to win the hand and score 1 mark. If the winning bid is 1 mark (42), 2 marks (84), 3 marks (126), 4 marks (168), or 5 marks (210), they must catch all 7 of the tricks in a hand. In this situation, the point count dominoes are of no value except for their denomination in the suits. If either team can score 7 marks before the opposition, they win the game.
   6. If one of the opposing partners wins the bid, the non-winning partners will work together to try to win points totaling enough to prevent the opposition partners from making their bid. Or, they will try to win at least one trick for bids greater than 1 mark (42). This means the opposition has been “set” and did not make their bid. The “setting” team gets the mark(s).
   7. This back and forth battle in bidding and as each domino is played in the tricks involves careful strategy. Every player is always trying to play smart, cooperate with his partner, outsmart and defeat the opposition.
4. SCORING
   1. Scoring will be in the simplified format of marks per hand. A total of 7 marks wins the game. A 30 to 41 bid equals 1 mark. 1, 2, 3, 4, 5, 6, or 7 mark bids result in that number of marks scored depending on making or setting the bidder.
   2. The score keeping visual representation in the SCORING area of “marks” can be selected in the settings menu to be either of two ways.
      1. “ALL” type score keeping - The winning score is indicated with an “ALL”. One stroke of each letter equals one mark. This totals the seven marks required to win a game. For example, the first left stroke of the A “/” = 1 mark, all three strokes of the A = 3 marks, an AL = 5 marks, AL/ = 6 marks and the seven strokes of ALL is seven marks.
      2. “TICKS” type score keeping - The TICKS form is indicated with an arrangement of lines (tally marks) for each mark. 4 parallel vertical ticks, then an angled crossing fifth tick on top of the four, and then two more parallel vertical ticks to the right. This totals the seven ticks to win a game.
   3. In physical human play, there will be no talking across the table (other than light banter in recreational play). Any other movements or actions that might be deemed as communication to any of the other players, is prohibited. AI42 has some random phrases that can be spoken at appropriate times and if sound is enabled.
   4. Each player can only see the dominoes he has drawn to his hand from the center pile after the shuffle and is not aware of any domino in another player’s hand. The player is free to rearrange or rotate any of his dominoes at any time. A menu setting can be used to override this. Setting “View All Hands” to ON, places all dominos in each hand face up. There is also an option to “Play All Hands”. This allows the human player to see all the dominos in each hand and play them with suggestions as set.
5. OTHER AI42 FEATURES
   1. Action Bar – A line of text in the lower left corner is used to indicate the next action or the result of the last action. For example “Select your dominoes from the center pile”, “Select and place a bid”, “Select a domino to play”, etc. This will also contain the justification or explanation of a bid or domino suggestion as required. Examples include; “I wouldn’t bid 30 on this hand because you don’t have any good trumps”, “I would bid 31 on this hand in 4’s”, “You must follow suit with a 3”, “Lead the 6-6 hoping to catch the 6-4”, and as many more as can be generated in the AI. Most of the suggestions will result from what the AI logic would play if it was in charge of selecting the bid or play. Just formatted in an English sentence. The purpose is to teach a beginning player how to follow the rules and give some clues as to the logic of good bidding and play.
   2. Save Game – This will save the current game in a file located in the specified directory. Everything up to this point will be saved. If enabled in the settings menu, restarting the program will automatically load the last saved game. The default name should be “AI42Saved.42”. The filename can be changed by the user, but the extension should always be “.42”
   3. Replay a hand – AI42 will keep a running track of all dominoes played in each trick during a game sorted by the trick and player. A listing of the tricks played can be found in the settings pull down menu box. Any previous trick can be selected for replay as a learning experience. The game will restore the dominos from that trick to the appropriate players and allow play as normal. There is also a selection to replay the hand with the same bid. The played hands will be cleared at the end of the game.
   4. Show All Dominoes – If enabled in the settings menu, all the domino faces in all four hands are exposed face up so the human players can see them. Play continues as before, but the dominoes are exposed. This can be used as a tool for teaching and learning.
   5. Play all hands – If enabled in the settings menu, all dominoes will be shown face up and any AI automatic play disabled. This will allow the human player to play or replay any hand. This can be a teaching and learning tool.
   6. BID/PLAY Suggestion Modes
      1. There are two suggestion modes. One for BID and one for PLAY.
      2. There are three menu settings for each BID and PLAY mode. The first is “OFF” (disabled), the second is “As Requested” (show a question mark “?”), and the third is “AUTO”. If “As Requested” or “AUTO” is enabled, bids and domino plays will be calculated by the AI logic and a suggestion will be shown by filling in the bid field or highlighting a domino to play. There will also be a line of text in the lower left Action line justifying and explaining the suggested bid or play. This should be generated using the AI logic and forming a sentence explaining why the AI thinks this is the best bid or play. It is up to the player to either choose to make that bid or play that domino. This is the primary player learning mode of the game. If PLAY/AUTO is enabled, the recommended domino to play is highlighted in a different color (yellow by default).
6. MENUS
   1. AI42 uses a typical menu bar row of text in the upper left area of the screen with pull down items. Implementation and appearance will be according to the operating system.
   2. Refer to the “AI42 Menu structure.xlsx” document and screen capture .PNG files for a basic arrangement with comments and clarifications for the menu items.
   3. Additional menu items may be added or rearranged for a more logical layout or appearance during development.
   4. Check boxes are used to enable/disable the items.
7. SCREEN WINDOW AREAS
   1. Review and implement the 2D screen capture .PNG files showing a typical user interface screen layout.
   2. The game will generally run in full screen mode. Other sizing modes can be used based on the operating system, screen resolution, and available screen area.
   3. The screen placement, sizing, text, etc. should allow for various screen pixel resolutions and automatically scale accordingly to achieve a playable game. This will include various domino sizes, auto text sizing, etc.
   4. All windows can be dragged for placement and resized by the user.
   5. The background color can be defined for each window.
   6. There are 6 resizable windowed areas on a typical screen; Bottom\_player, Left\_player, Top\_player, Right\_player, Table, Discard, Scoring. There is also the Action bar text line in the lower left corner.
      1. Player’s areas (ie. Bottom\_player, Left\_player, etc.)
         1. There are 4 of these areas on each side around the center Table area.
         2. Each window is large enough to containing the players hand of 7 dominos horizontally oriented.
         3. The dominos will be arranged in either 2 rows (top/bottom players) or 2 columns (left/right players) of 3 and 4 dominos. The row/column with 4 dominos is placed closest to the Table area, and the row/column with 3 dominos is placed closest to the player.
         4. Domino spacing should maximize the domino size.
         5. The player’s area should have a label indicating the Players name.
         6. There should be a text area in a contrasting color (default yellow) just inside the player’s area on the center Table to indicate a player’s bid as it is made. This text blanks after bidding.
      2. Table area
         1. This is the primary field of play and is the largest window. It equates to the physical table for human players.
         2. Undealt dominoes are initially horizontally oriented and arranged in a center 4 column x 7 row block area for drawing by the players clicking or dragging over them.
         3. The player names and dominoes in each hand are placed toward the four edges and arranged for easy viewing and play.
         4. After drawing their hands the players are free to click and drag a domino to another location in their hand placement causing a swap with the other domino. A single click will rotate the domino 180 degrees to swap the visual suit ends. The purpose is to allow the player to sort their hand in a manner that makes sense to them.
         5. The dominoes for the bottom player should initially be placed horizontally face up as they are drawn from the pile in 2 rows of 4 above and 3 below.
         6. The dominoes for the left player should initially be placed face down (back logo showing) as they are drawn from the pile horizontally in 2 columns of 3 on the left and 4 on the right.
         7. The dominoes for the top player should initially be placed face down (back logo showing) as they are drawn from the pile horizontally in 2 rows of 3 above and 4 below.
         8. The dominoes for the right player should initially be placed face down (back logo showing) as they are drawn from the pile horizontally in 2 columns of 4 on the left and 3 on the right.
         9. The bid for each player will be shown in the center table in an area closest to the player in a contrasting font (default yellow). It will remain and pause for 3 seconds after the bidding is complete before play starts. This gives the players time to look at each.
         10. The bottom player’s BID box will be placed in the center of the table area during the bidding process when it is his turn. Refer to the screen captures for the layout of this box.
         11. A popup window will show indicating the bid of the four players and the winning bid.
         12. The winning bid then goes to the SCORING box in the line of the winning bid team and the number is shown.
         13. If the winning bidder is AI, trumps are selected automatically.
         14. If a human wins the bid, a popup box will appear in the center table area allowing them to select the trump.
         15. Once selected, the trump is shown in the SCORING box.
         16. In general, any messages requiring a user response will pop up in the center of the table area and indicate the player to make the response.
         17. All dominoes are shown face up in the center PLAY area as they are played. They are arranged in a pattern with each player’s domino in front of his hand. Refer to the screen captures.
         18. The play rate and pause after all dominoes are played is determined in the settings menu PLAY SPEED as FAST, MEDIUM, or SLOW.
         19. When all four dominoes are played, they are moved to the DISCARD area.
      3. Discard area
         1. There are two sections to this window. US and THEM. US is located at the bottom and THEM is at the top.
         2. As tricks are caught, the played dominoes are moved to rows of four in this area. They are rotated 90 degrees to appear vertical and arranged in the order played from left to right.
         3. If the trick was won by the bottom/top US team, it is stacked from the bottom upward. If the trick was won by the left/right THEM team, it is stacked from the top down.
         4. The rows will stack inward for additional tricks.
         5. A special condition is required for bids of 2 marks or above. Only the last two hands played are visible in the DISCARD area. The newest incoming hand covers the oldest hand in the stack. The two row stack is placed to the upper (THEM) or lower (US) side based on the bid and who catches the trick.
      4. Score area
         1. Refer to the screen captures for the contents of this area
         2. The data shown is generally the current status of play and will indicate in three rows of text; The top line headers (in a contrasting bold font and underlined) are TEAM, BID, POINTS, MARKS, TRUMP, and LEAD. The second row under TEAM is THEM and the third row under TEAM is US. The corresponding data for each team is shown under the other headers.
   7. NEED TO REVIEW THE GRAPHIC SCREEN SHOTS TO EVALUATE AND UNDERSTAND EVERY WINDOW AND FIELD.
8. BEGINNING A NEW GAME
   1. Shuffle - At the beginning of each game, the 28 dominoes are shuffled (randomized) and placed face down in the center of the table. The dominoes are randomized to indicate a shuffle with the corresponding SHUFFLE audio sound. This action should define the hidden variable parameters and defaults for each domino. The primary variables are Suit\_1 and Suit\_2 with no duplications. All 28 are horizontally oriented and arranged in a 4 column wide x 7 row high block filling the center of the table.
   2. Draw for dealer - Each player draws one domino then it is placed face up in front of him on the Table. The player with the highest total number of pips (Total\_pips) is designated as the first Dealer. If there is a tie, the tying players will draw again until a winner is determined. A popup box in the center will indicate the progression and the winning Dealer. This process is not repeated for every hand, only the initial deal at the beginning of a game. To facilitate this, the Bottom\_player is the first to select a domino to initiate the process. The other players draw in turn around the table.
9. SHUFFLE AND DRAW
   1. Once the Dealer is determined as above (or in the rotation below), the game will automatically clear the table, shuffle to randomize the dominos, and place them in the 4 column x 7 row block in the Table center.
   2. In subsequent hands the dealer/shuffling responsibility moves to the left (clockwise) around the table. For example, if the bottom player is initially selected as the first dealer, the designated Dealer for the next hand will be the left player, then the top player, then the right player in subsequent hands.
   3. Once the dominoes are shuffled by the dealer, the three other (non-dealer) players draw 7 dominoes from the center pile to comprise their hands. The dealer selects last and takes the 7 remaining dominoes for his hand.
   4. Domino selection is done simultaneously by the human and AI players. The AI domino selection is random from the remaining dominos and delayed by 500 milliseconds to allow the human player the opportunity to select dominos.
   5. The process is complete when all 4 players have 7 dominos, regardless of the order they were selected or hands filled.
10. BIDDING
    1. Bidding is done in a rotation starting to the dealers left (clockwise from above) and rotation continues (clockwise from above) in turn to each player’s left. The dealer is last to bid. NOTE: in some variations, the dealer may be forced to bid if everyone has passed to this point. This can be enabled in AI42.
    2. There is only one round of bidding. Each player clearly states his bid in turn (moving left) so that all can hear. The bid appears in text on the table in front of the player (as noted above) and remains until bidding is complete. The highest bid wins the bid.
    3. Players can Pass (no bid), bid between 30 and 41 points, bid 1 mark (42 points) or 2 marks (84 points), 3 marks (126 points) if they want to SPLASH as shown in the variation below, or 4 marks (168 points) if they want to PLUNGE as shown in the variation below.
    4. 3 marks (126 points) can only be bid if 2 marks were bid previously. Likewise 4 marks can only be bid if there has been a previous 3 mark bid. Finally, 5 marks (210 points) can only be bid if a previous 4 marks is bid or a previous Plunge bid has been made. NOTE: If the first bidder bids 4 marks PLUNGE, there is a possibility for the remaining bidders to raise the bid by 1 mark each, thus making for a possible 7 mark (294 points) bid by the dealer with the last bid.
    5. After each of the four players has bid in turn (Dealer last), bidding is complete. The highest bidder wins and play begins. A popup will appear indicating each players bid and the winner.
    6. The winning bidder calls the game he wants to play. STRAIGHT-42 (bid was 30 to 41) with a trump, no-trump, or follow-me. It is also possible to play STRAIGHT-42 with a 1-7 mark bid, but the bidder must catch every trick. In recreational play, the winning bidder may call one of the variations below if the bid was 1-7 marks. (Nel-O, SEVENS, SPLASH, or PLUNGE)
11. STRAIGHT-42 GAME PLAY
    1. Play continues according the rules as stated above until one set of partners gets to 7 marks and wins the game.
12. SPECIALIZED GAME VARIATIONS
    1. Specialized games are not allowed in tournament play mode
    2. Specialized games are enabled/disabled in the Settings menu
       1. Nel-O (often called Nello) is a specialized variation from STRAIGHT-42 play allowed in recreational settings.
          1. Bidding Nel-O means the bidder will catch none of the tricks after leading the first domino.
          2. A initial minimum bid of 1 or 2 marks is allowed. If 1 or 2 marks was already bid, the bidder can increase any previous bid by 1 mark.
          3. If a player wins the bid and calls Nel-O, that player must then define how the doubles will rank in their suits according to the additional rule variations below. Each of these variations can be enabled/disabled in the settings menu.
             1. Nel-O – “Doubles are a separate suit” (sometimes called Doubles-catch-doubles). Double are not high in their suit like STRAIGHT-42, but a separate suit with the 6-6 being the biggest and 0-0 smallest.
             2. Nel-O – “Doubles are high in their suit” (sometimes called Doubles-catch-everything). In this variation, doubles are the largest domino in their suit similar to STRAIGHT-42 and will catch anything played in that suit.
             3. Nel-O – “Doubles are low in their suit” (sometimes called Doubles-catch-nothing). In this variation, doubles are the smallest domino in their respective suits. For example the 0-0 and 1-1 can be caught by the 0-1, any 3 will catch the 3-3, any 6 will catch the 6-6, etc. This logic follows for all doubles.
             4. The bidder’s partner sits out this hand and doesn’t play. Each of the opposing partners is trying to play so that both of them play dominoes that are below the value of the bidder’s domino forcing the bidder to catch a trick and be “set”, thus losing the mark(s) bid.
             5. If the opposing partners get it right, they can force the bidder to catch a trick and lose the hand.
             6. Just like in STRAIGHT-42, if any player can’t follow suit, he can play any domino in his hand. This often sets Nel-O. General logic indicates if a player cannot follow suit, they should play the highest domino available, so if they get the lead they have play lower dominoes left to play.
       2. SEVENS (sometimes called Near-seven)
          1. It is usually not allowed because no skill is involved, but it can be enabled in AI42.
          2. In SEVENS there are no trumps. Each domino’s value is based on the total number of pips on the face with 7 being ideal (three dominoes have 7 pips 4-3, 5-2, 6-1).
          3. A minimum bid of 1 or 2 marks is allowed. If 1 or 2 marks was already bid, the following bidders can increase any previous bid by 1 mark.
          4. All other dominoes are “Away” from 7. The number away is calculated by the total number of pips away from 7. For example the 6-0, 5-1, 4-2, 3-3 total to 6 pips and are “1-away”, making them less valuable than a 7. Likewise, the 6-2, 5-3, 4-4 total to 8 and are also “1-away” and less valuable than a 7.
          5. This totaling of pips continues thru all the dominoes. For example the 5-4 is 9 and 2-away, the 3-1 is 4 and 3-away, the 6-5 is 11 and 4-away, the 6-6 is 12 and 5-away, the 0-0 is 7-away and least valuable of all.
          6. The bidder is hoping his dominos (played away from 7 in turn) is closer to 7 than any other player and he catches all the tricks. Ties go to the bidder.
          7. As the trick play rounds progress, each player must play his domino closest to 7 pips.
          8. The bidder wins the trick if his played domino is closer to 7 or equal to the “away” of any other domino played in that trick. Ties go to the bidder.
          9. The bidder is set if any of his dominoes is farther “away” from 7 pips than any domino played in that trick.
       3. SPLASH and PLUNGE
          1. SPLASH and PLUNGE are two game variations with quite a risk. They were invented when a team is well behind in scoring and want to make a major gamble to catch up. The two games are played similar to STRAIGHT-42 with a twist at the beginning.
          2. The bidder must have 3 doubles to bid SPLASH and 4 doubles to bid PLUNGE.
          3. If the bidder bids SPLASH then the bid is automatically 3 marks (126). If the bidder bids PLUNGE then the bid is automatically 4 marks (168).
          4. The bidder’s partner normally has no say in the SPLASH or PLUNGE bid or the risk. By default, he must play the hand dealt and try to help make the bid. AI42 has a menu setting that will enable the bidder to ask his partner if he wants to SPLASH or PLUNGE? This will create a prompt for the partner to answer. The partner must evaluate his hand on the likelihood of taking on the risk and answer accordingly. This is normally set to disabled, but can be enabled.
          5. Play begins with the bidder’s partner leading a domino and calling the trump suit. He is hoping the bidder has the double for it. If not, then one of the opposition partners has the double and the bid is set because the first trick is lost. This causes the loss of either 3 or 4 marks. If the bidder does have the double to the larger end of the domino and called trump, he catches the trick and play resumes as in normal STRAIGHT-42. Trumps are as called by the original domino played.
          6. The bidding partners must catch all of the tricks to win the 3 or 4 mark bid. If they lose any trick, they are set and the opposing partners get the marks.
       4. FORCED BIDDING
          1. Forced bidding is common in recreational play to keep the game moving and cause less re-shuffles. There is fun in periodically being forced to bid and play a hand that would normally be a pass.
          2. If the first 3 players pass, the Dealer is forced to bid something. This can be any bid based on his hand with a minimum bid of 26, 30, or 1 mark per a menu setting.
          3. AI42 can be enabled/disabled for FORCED BIDDING in the settings menu.
          4. FORCED BIDDING can be set to either 30 or 26 points in the settings menu. If enabled, a 26 bid is only allowed on a forced bid, otherwise the 30 minimum bid rule applies. The bidder can alternately bid 1 mark which exceeds the 26 or 30 minimum for games that require “marks” bids.

END OF SPECS