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Location-Aware Mobile Game
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Twister on iPAQs

The rules of this game are very similar to that of the original version of Twister. In this iPAQ Twister game, students form teams of four, where each student represents either a left/right hand/foot. Like the hands and feet attached to the trunk of a human body, the four students in a team need to stay connected, either by holding hands or by touching another of his teammates. Each student gets an iPAQ attached to a cricket so that his location in a room can be tracked. Beacons are evenly placed throughout the room on the walls and ceiling in order for the cricket listeners to get position coordinates of the left/right hand/foot. The game can be played in a room with an enlarged version of the Twister mat or across several rooms, even around the globe. While the circles on the original Twister mat are large enough to fit two feet, the circles for this iPAQ game are large enough for a person to kneel on and are spaced out accordingly. Thus, MIT students can play with Singapore students, but all members of a team must be able to stay physically, not virtually, connected.

The game application running on each iPAQ starts off with a welcome screen that asks each team member to type in their team number and representing body part (left/right hand/foot). (Note: The term "body part" is used to refer specifically to the left/right hand/foot.) This information is sent as an ID tuple (team, body part) to the game server which tracks each team member's location. Then the iPAQ screen displays the Twister spinner, where each quadrant is divided into four colors (red, yellow, green, blue) for each body part. After the dial spins, everyone playing the game sees the same call, i.e. left foot on blue. The student with the specified body part must move to an unoccupied, correctly colored circle, while remaining connected to the rest of his team. At this point, the screen changes to an image of the Twister mat with the current call labeled at the top of the screen. Updated periodically, the Twister mat screen darkens and marks the circles that are occupied with the corresponding team number, so that MIT teams know which circles have been occupied by Singapore teams, and vice versa.

Once the student has decided where to move to, he presses the OK button at the bottom of the screen. Then his iPAQ sends his ID tuple and position coordinate to the game server. The game server first checks that no one else has occupied that circle. If another team has occupied the circle, then a message appears on the screen: "Team <#> at <MIT/Singapore> has already occupied the circle. You need to choose another <red/yellow/green/blue> circle." The student can either press OK to try again or the "I can't" button to forfeit. When a team forfeits, its team members ID are tagged invalid in the game server's database and the application exits. The game server also keeps track of all the position coordinates the students tried during a call. Hence, the server additionally checks to make sure the student did not return to the same location he had started at for a call. If he does, then a message appears on the screen, informing him that this is an invalid circle to occupy because he started off at that circle. If the game server finds that no one has occupied the circle that the student chooses to move to, a "You have made a successful move" message pops up on the screen for the student to dismiss. Until all teams have made successful moves or forfeited, the screen remains on the display of the Twister mat which is updated periodically for teams to see one another's locations. Once the current call has been completed by all remaining teams, each iPAQs screen then displays the Twister spinner and another round begins.

When setting up the room(s), the game server needs to know which position coordinates correspond to which circle on the Twister mat. One way this can be achieved is by placing the iPAQ attached to a cricket at each circle's center point, so that the game server can mathematically verify whether the position coordinate sent by a student is within an unoccupied circle. It is strongly advised that throughout the game, students are holding their iPAQs directly above the circle they are on. To make the game more challenging, there can be two calls made during a round, so that two different team members have to change their location. Note, anyone can play this game, but this has been written for an audience of MIT and Singapore students.