CS6750: Assignment P4

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1 GOMS MODEL

Initial Situation Need to contact professor for grade explanation		
	Selection Rules	
If message is formal	If question is casual	If professor is not reachable by email or Piazza
Method 1 Email	*Method 2* Private Piazza Post	*Method 3* In-Person
Operators Open Email (2 seconds) ↓ Select "Compose" (1 second) ↓ Write Message (30 seconds) ↓ Click "Send" (1 second) **Execution time:** **34 seconds**	*Operators* Open Piazza (2 seconds) ↓ Select "Post to Instructor(s)" (1 second) ↓ Write Post (30 seconds) ↓ Click "Post Question" (1 second) **Execution time:** **34 seconds**	*Operators* Open flight website (2 seconds) ↓ Find affordable and convenient flight (10 minutes) ↓ Purchase round-trip flight to Atlanta (2 minutes) ↓ Pack baggage (10 minutes) ↓ Order a Lyft to airport (10 seconds) ↓ Ride to Airport (30 minutes) ↓ Check-in (5 minutes) ↓ Go through Security

		(20 minutes) ↓ Wait for boarding to start. (15 minutes) ↓ Board flight (5 minutes) ↓ Fly (5 hours) ↓ Disembark plane (10 minutes) ↓ Navigate to airport exit (10 minutes) ↓ Order a Lyft (10 seconds) ↓ Ride to GT Campus (30 minutes) ↓ Navigate to Professor's office (10 minutes) ↓ Knock on door (2 seconds) ↓ Greet Professor (2 seconds) ↓ Ask for explanation (15 seconds) ↓ Discuss with Professor (10 minutes) **Execution time: 8 hours**
Goal: Receive grade explanation		

2 HIERARCHICAL TASK ANALYSIS

- Complete assignment
    - Navigate to assignment page
        - Enter omscs6750.gatech.edu into URL bar
        - Hit enter
        - Select current semester
        - Select current assignment from dropdown
    - Read assignment
        - Scroll down
    - Write down answers to assignment prompts
        - Open document editor
        - Write abstract if applicable
        - Type responses to questions
        - Review
            - Scroll to top
            - Scroll down as review progresses
            - Edit where desired
                - Click to location of required edit
                - Backspace
                - Type
        - Click “Save”
- Submit assignment to Canvas
    - Navigate to assignment page
        - Type canvas.gatech.edu into URL bar
        - Hit enter
        - Select Login
        - Enter login info
        - Navigate to course
            - Click selected course
        - Click on assignments in sidebar
        - Scroll to selected assignment
        - Click selected assignment
    - Upload assignment
        - Click “Submit Assignment”
        - Click “Choose File”
        - Scroll to desired file within file pop-up file explorer

        - Click desired file
        - Click “Open”
    - Click “Submit Assignment”
    - Wait for assignment to submit and page changes
    - Confirm page reads “Submitted”
- Receive grade and feedback
    - Wait for email “Assignment Graded”
    - Open email
        - Type mail.gatech.edu into URL bar
        - Scroll through inbox
        - Click on “Assignment Graded” Email
    - Navigate to Assignment
        - Select “You can review the assignment here”
    - View grade in upper right corner
    - View feedback on right side, below grade

3 PRE-GPS DISTRIBUTED COGNITION

1.1 Cognitive Activities

Before GPS navigation, navigation systems were often comprised of a married couple (individuals being one driver and one passenger), and artifacts such as a map, a pen, and road signs.

In terms of the individuals, the driver often performs tasks such as perception, reasoning, and acting. The driver needs to perceive the road itself, other drivers, street signals so they know when to go or stop, and street signs such as speed limits. Using these perceptions, the driver can reason such as when it is safe to turn, what the correct speed is, and when to stop. The driver then acts on these reasonings, turning the wheel, pressing the gas, pressing the brake, and turning on a turn signal or lights when necessary. The passenger often leads navigation in order to offload the cognitive load of navigation from the driver. A passenger acting as a navigator often uses perception, memory, reasoning, and acting. A passenger will need to perceive road signs and position in order to properly navigate the route. They will also need to perceive the map for comparison to their surroundings for current position and route creation. Memory is used when remembering the ultimate destination. The passenger will often need to use reasoning when using a map in order to find an efficient and viable route from

origin to destination. The passenger will need to act when creating a route and when announcing upcoming directions to the driver so he or she can act on those directions.

Artifacts such as a pen, map, and road signs can help reduce the cognitive load on the individuals. A pen assists with memory of origin and destination as well as the chosen route by tracing desired roads and circling origins and destinations. The map itself assists with memory, and reasoning. The map conveys roads, distances, and ultimately different routes drivers can take. With a map, drivers and passengers don't need to memorize all these small details. By tracing a route on a map, navigators can reason what a viable and short route might be, as well as potential alternative routes should the driver take a wrong turn. Road signs offload cognitive load pertaining to reasoning and acting for drivers. Road signs can tell what is allowed in terms of driving actions, so drivers can reason when and where to act.

1.2 Lone Driver Comparison

When the system above lacks a passenger to assist on the navigation, all of the tasks associated with a navigator are relegated back onto the driver, increasing the cognitive load. For example, a driver will need to find the route beforehand. They will then need to memorize the route, including the turns, streets, and potential distances. Should the driver's memory be loaded too fully, he or she will need to take a look at the map again to ensure they are sticking to the route, and if not, what alternative routes they can take. Since a driver's memory is limited, they will need to remember keenly what the street names are for when he or she needs to turn since keeping an eye on the map may pose as a hazard. This is a stark contrast to having a navigator to help warn the driver of when a turn is coming up. Social cognition reveals that navigation and driving requires a lot of memory and perception. The task involves memorizing position, predicting future actions, and route creation that may overwhelm a lone driver. The social relationships among the parts of the system affect the success of the system as a whole by offloading this cognitive load from the driver, allowing the driver to focus on perception and acting while driving on the road and ultimately creating a smooth driving and navigation process.

4 DISTRIBUTED COGNITION LENS

In previous assignments, I've described the task of washing clothes using my washing machine, wherein I load my dirty clothes, add detergent, select settings, and turn on the machine. The pieces in the system include me (the individual) and artifacts such as the detergent, settings dial, the screen, and the on button.

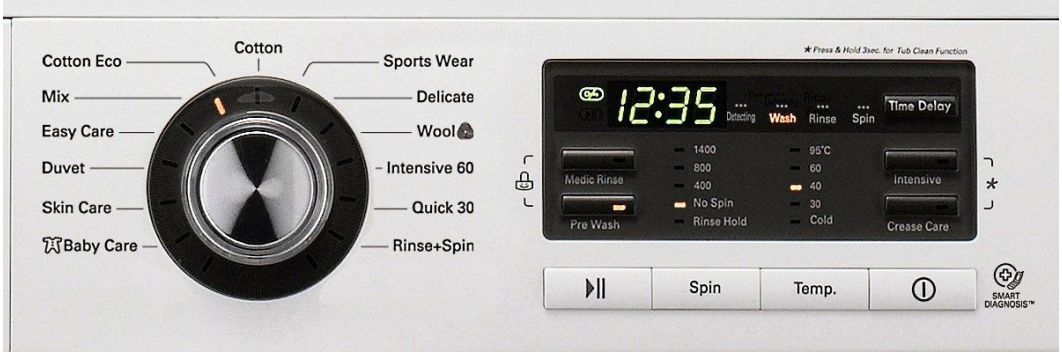

Figure 1—Washing Machine Interface (Source: UX Stack Exchange)

In terms of cognitive tasks, I employ activities such as perception, reasoning, and acting. I perceive what my dirty clothes are as opposed to my clean ones. I also need to perceive the colors of each garment as a separate between lights and darks, reasoning which goes into each pile. I then act by loading these clothes into the machine. I then employ perception of the different settings available to me on the machine, reason which one best fits these clothes, and act by turning the dial to my preferred setting and hitting start.

The artifacts offload my cognitive load for activities such as perception, memory, and acting. The cap for my detergent has lines that indicate how much detergent is needed to clean different sizes of laundry loads, meaning I don't need to perceive nor remember these amounts. The settings dial conveys all of the different options I have for washing clothes. I don't need to remember what is available and all I have to do is reason which of these options fits my laundry best and I can just turn the dial. The screen conveys which part of the cycle my laundry is currently going through as well as how much time is left, offloading the need to perceive how far my laundry has progressed through the task and reasoning what temperature and water levels are needed. It also conveys the results of my selected setting, such as temperature for my laundry type. This includes hot temperature for my light laundry and cold temperature water for

my dark laundry. These settings that are automatically chosen for me offload my need to reason what would be best for my laundry. The on button helps offload the act of starting the machine. The machine itself has built-in settings, such as how much water to use and how many spins to use, that offload my need to memorize how much I need of each and removes any need for me to act on these subtasks.