

## Week 1 and Week 2

### THINKING ABOUT THINKING

#### *BRAINSTORMING*

*Definition: A problem-solving technique that involves the spontaneous contribution of ideas from all members of the group*

*Merriam-Webster*

Questions of interest:

*Problem to solve? How can we solve it? What would we like to do? What problem could it solve?*

What problems would we like to solve?

1. How much money gas.
2. Cold fusion.
3. How to lower your heating bill?
4. Transmit a signal better on a wireless router.
5. Robot position over surface.
6. How to calculate the velocity of a bullet.
7. How to collect the iron balls in a robot competition.
8. How to sense the color of the balls and which direction they are at.
9. How to make something communicate through a USB port (interface a USB).
10. How to get free cable.
11. How to get infrared pictures through my digital camera.
12. How to make your truck faster.
13. How to eliminate our fossil fuels.
14. How to communicate wirelessly with printer.
15. How to speed up your laptop.
16. How to have self- charging battery.
17. Design a solar charging system for self- powered sign or kiosk
18. How to transmit video or data over long distances.
19. Cure cancer.
20. Excursive your muscles while watching TV.
21. How to get better cell phone reception.

What do you want to design?

1. An antenna that works better.
2. Device that answers 20.

3. Faster detection of cancer, dog that smells the cancer.
4. Lightweight transmitter and receiver for Big Blue.
5. Cheaper version of a wireless connection to the printer.
6. Accurate handheld breath analyzer (inexpensive).
7. Lower power LCD display.
8. Solar charging system for batteries.
9. Body heat to recharge batteries.
10. Stand alone fuel controller.
11. Firmware for camera to separate out the infrared.
12. High speed camera.
13. Robotic hand to collect the colored balls.
14. System to detect color differences.
15. High efficiency solar panel.
16. System that would interface with blood sugar devices and a computer.
17. Electromagnet to pick up steel balls.
18. Alter an optical mouse to measure distance.
19. Very light weight thumb print scanner.
20. Radio beacon to set off explosives based on chemical properties.

## **TASK ONE (DUE TUESDAY 01/25/2005)**

*Objective: This exercise encourages students to utilize their brainstorming skills to improve their ability in generating creative thoughts.*

There are three parts to this task. First of all, you are required to brainstorm a potential problem which you intend to resolve. Consequently, you need to come up with a list of possible solutions to overcome that particular problem. For the last part, a refinement of the list of solutions should be performed, follow suit by the criteria which you imposed for the refinement. Do explain in detail the virtues, drawbacks and tradeoffs for implementing the corresponding refinement.

**NOTE:** This task can be done as a group, but the individual contributions must be noted in the individual student's notebook. In addition, the group members should also be referenced in the notebook.

Here's a common example.

*Problem: Traffic congestion*

*List of solutions:*

- a. Road widening*
- b. Increase in public transportation, e.g., buses*
- c. Carpooling*
- d. Reversible lanes implementation*
- e. HOV lanes implementation*
- f. Correcting timing of traffic lights*
- g. Installation of new traffic lights*

*Refined List:*

- a. Carpooling*
- b. Reversible lanes implementation*
- c. Correcting timing of traffic lights*
- d. HOV lanes implementation*

*Refinement descriptions:*

- a. Widening the existing roads might not be a plausible solution because certain areas such as downtown are very dense with buildings, so there might not be enough space for such measure.*

- b. Increasing public transportation might be a reasonable solution, but it is not environmental friendly as heavy vehicles such as buses use diesel fuel, and is hazardous to the air quality.*
- c. Carpooling is overall a good solution because reducing the number of vehicles on the roads will help congestions, as well as decrease air pollution.*
- d. Reversible lanes are cost-friendly since they do not require new lanes to be built. Most places have implemented this, including Lexington.*
- e. Even though HOV lanes require more new lanes and thus are not cost-friendly, it is obvious that by encouraging carpooling, these lanes will be really convenient for vehicles with more occupants.*
- f. Correcting timing of the signal lights is inexpensive, and easily achievable.*
- g. Installation of new traffic lights might cause needless delay and waste of tax payer dollars!*