PEER-LED TEAM LEARNING
COMPUTER SCIENCE

MEETING 2 – STUDENT VERSION

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Exercise 1: Multiplication flowchart
As a group try and brainstorm ways to perform multiplication given only basic mathematical functions. Together, create a flowchart showing all of these variables, decisions, and loops on the board.

Exercise 2: 'Guess my number' flowchart
The game: One person picks a number between 1 and 10. The other person must guess this number in 4 or less guesses.

You will be grouped into pairs, and play this game for a few minutes. Each pair will construct a flowchart describing their method for guessing the number. We will then meet as an entire group, and share ideas of how to guess the number most efficiently.

Exercise 3: Logical Thinking
Try working on this problem by yourself first. In about 5-10 minutes, you will be allowed to work in small groups (of 2-3 people):

Assume that you have 8 coins, and you know that 7 are 'okay' but one is 'bad'. You know that the bad coin has a different weight than the good coins, but you don't know whether it is heavier or lighter.

Figure out how, using only a balance scale, you can find out which is the bad coin using just 3 weighings. (Hint: Find a way to determine that half of the coins are 'okay' with just 1 weighing.)

Now do the same thing assuming that you have 9 coins, one of which is bad. (Still use just 3 weighings to find the bad coin.)

And now for a real challenge, do the same thing assuming that you have 13 coins.

Exercise 4: Looking at a simple code
These are the rules of how to play NIM 2:

> There is a pile of stones in the center with players sitting in a circle around it.
> Each player must pick up 1 or 2 stones in each turn. The person who picks
> up the last stone is the loser.

Split into pairs, and play several rounds of the NIM 2 game. While playing, try to think
about winning strategies.

After playing, you will receive a handout showing some code. Try to turn the code into a
flowchart, and explain the method that the code is performing.

Exercise 5: Collaborating on code
First, we will pick a general topic to code. After being broken into groups of 2-3 people,
each smaller group will be assigned a few particular tasks that help make up the whole code.

After doing this separately, combine the code into one program and see how efficient it is, or
if there are any ways which they would improve it.

Exercise 6: Illegible code?
You will each receive a slip of paper with a function that you must carry out in code. First,
create a flow chart solving the problem, and then write the actual code. After all students are
finished, we will swap the CODE ONLY with a neighbor. You must guess what the
function of your neighbor's code is. After, we will discuss if each other's code was easy or
difficult to decipher, as well as ways to improve this for the future.

Exercise 4 - handout
Code to determine how many stones to remove for NIM 2
(n stones remain)

```java
int removenum(int n){
        if(n == 0){
                System.out.println("Congratulations!  You won!");
                return 0;
        }//if
        int r = (n+2)%(3);
        if(r == 0){
                return 1;
        }else{
                return r;
        }//else
}//removenum
```