Computer Science

Last weeks dua

Dua of the Week!

So what is computer science?

- Computer science is all about programming and getting computers to solve different kinds of problems.
- The person who writes instructions for the computer to follow is called a **programmer**.

What does code look like?

- These programs are written in programming language called **Java** and **Perl.**
- Just as there are many different languages that you can speak, there are many different languages that you can program with.

JAVA →

A Java Implementation of Bubble Sort (Executable Code)

```
public static void bubbleSort(int[] data)
{  boolean isSorted;
   int tempVariable;
   int numberOfTimesLooped = 0;
   do
   {  isSorted = true;
      for (int i = 1; i < data.length - numberOfTimesLooped; i++)
      {
         if (data[i] < data[i - 1])
         {  tempVariable = data[i];
            data[i] = data[i - 1];
            data[i - 1] = tempVariable;
            isSorted = false;
         }
      } numberOfTimesLooped++;
   } while (!isSorted);
}
```

PERL →

A Perl Implementation of Bubble Sort (Interpreted Code)

```
sub swap {
  ($_[0], $_[1]) = ($_[1], $_[0]);
}

sub bubble_sort {
  for ($i=$[; $i < $#_; ++$i) {
    for ($j=$[; $j < $#_; ++$j) {
      ($_[$j] > $ _[$j+1]) && swap($_[$j], $_[$j+1]);
    }
  }
}
```

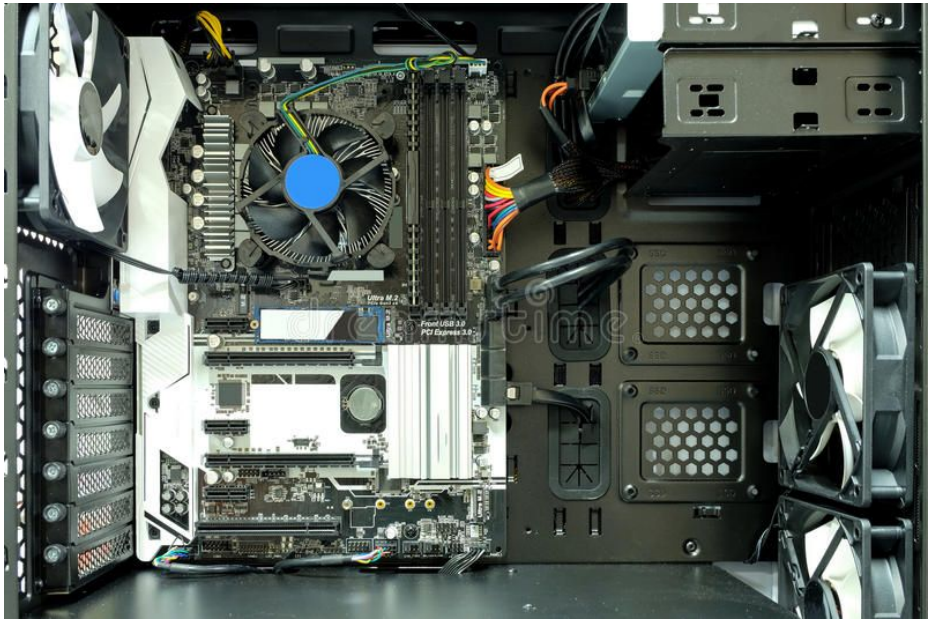
JAVA →

```
/**
 * Gets the ith element from the given list by repositioning the specified
 * list listIterator.
 */
private static <T> T get(ListIterator<? extends T> i, int index) {
T obj = null;
    int pos = i.nextIndex();
    if (pos <= index) {
        do {
            obj = i.next();
        } while (pos++ < index);
    } else {
        do {
            obj = i.previous();
        } while (--pos > index);
    }
```

Activity: What do you think the inside of a computer looks like?

- On a sheet of paper, draw what you think the inside of a computer looks like.

The inside of a computer looks like...



Helping others and doing good deeds

- “Goodness does not consist in turning your face towards East or West. The truly good are those who believe in God and the Last Day, in the angels, the Scripture, and the prophets; who give away some of their wealth, however much they cherish it, to their relatives, to orphans, the needy, travelers and beggars and to liberate those in debt and bondage; those who keep up the prayers and pay the prescribed alms; who keep pledges whenever they make them; who are steadfast in misfortune, adversity and times of danger. These are the ones who are true, and it is they who are aware of God. (Al Quran 2:177)”

- We must remember to take care of others and to help them, and to remember Allah SWT in times of happiness and sadness, and to always thank Him.

How can you use computer science to help the world?

- Create a website to help people make donations to help the poor and needy
- Create a Quran app so that people are able to read the Quran whenever they want
- What are some other ways we can use computer science to help others?

What is a Contradiction?

- If I say that something is green, but then I say that it is not green, that is a **contradiction**
- A contradiction is saying things together that are opposites of each other
- When we want our programs to work correctly, we have to make sure that there are no contradictions, otherwise your program will not work correctly
- Can someone come up with a contradiction?

Algorithms!

- An **algorithm** is a set of steps to do something.
- A computer program is an algorithm, the steps of the algorithm to have to be correct and in the right order, and a computer has to understand them
- One of the parts of an algorithm is a **conditional statement**
- A conditional statement tells the computer to do the next step only if something is true.

What words make up conditional statements?

If

Then

Else

If else

Activity: Let's play a game and practice algorithms!

We'll play a game, similar to Simon says, but you have to follow an algorithm with conditional statements to play. If i'm telling you to what to do, then I am the programmer, and you guys will be the computers:

- **If** you are wearing a blue shirt, **then** stand up
- **If** you are not standing up, and you like vegetables (?) **then** raise your hand, **else** switch spots with another student who is standing
- **If** you are standing and wearing orange **then** take two steps forward **else if** you are raising your hand **then** say your name.

Now let’s have someone else be the programmer, and they have to tell us what to do by using conditional statements!

Binary!

- Computers only understand binary numbers.
- Binary is just 1 and 0. So it's like having your only numbers that you're allowed to use be a 1 and a 0
- When you watch a video on the internet, or play a game, or skype with your family, the computer is only dealing with 1's and 0's!

Activity: Binary picture

- We are going to make a binary picture
- On the grid given, if there is a 0 in the box, color that box black, if there is a 1 in the box, don't color it.
- Try to see what image you make in the end!