Questions and Exercises

These questions and exercises is an opportunity to see what you've learnt from the lecture as well as practice the new things we've been talking about. In other words, these questions and exercises are completely optional but it's recomended to do them. In the end of the document you will find the answers to the questions as well as possible solutions to the exercises, note that one can solve an exercise in different ways. There will also be some suggestions about what one could code if one want to continue with some more advanced things. These suggestions will not come with a possible solution and might include things that haven't been covered in the lecture.

Question 1
What's so special with a block with a tile entity compared to a block without?

Question 2
How do we assign a tile entity to a block?

Exercise 1
Create a block that loops through 18 different textures. The looping process should be handled by the server, the client won't know anything about the interval or anything. Observe that meta data can only store 16 different values so that's not an option here. The texture should not be saved when the world unoads.

If you don't want to use 18 textures you can use fewer if you would like, but you're still not allowed to use meta data for the sync in this exercise.

If you don't want to create your own textures you can get some example textures in the link below https://dl.dropboxusercontent.com/u/46486053/NumberTextures.zip

Exercise 2
Create a block which keeps track on the times it has been right clicked and left clicked. If these values are the same, the block should use another texture. The amounts of clicks should be saved when the world is unloaded and should of course be loaded again when it starts.

If you don't want to create your own textures you can get some example textures at the link below https://dl.dropboxusercontent.com/u/46486053/ClickerTextures.zip

Further explorations 1
Improve the weird bomb so it starts spreading when the placed block receives a redstone pulse. Make sure that it's not activated multiple times. If the block hasn't started spreading yet, one should be able to pick it up properly.

Further explorations 2

Improve the code from Exercise 2. Make sure that it sends out different strengths of redstone depending on the clicks. If they are the same, send out a signal of strength 7. If you have more right clicks than left clicks, increae it. For the opposite decrease it. For instance, if you have 4 left clicks and 2 right clicks it shoul give the signal strength of 5. Make sure that the client knows about the redstone strength.

If the desired strength would be greater than 15, set it to 15. If it should be lesser than 0, set it to 0.

Answers and solutions

Answer to Question 1

For each location that the block with the tile entity is placed, a new instance of the tile entity is created. Since there's only one block of each type you can't modify fields in there, it would change them for all placed blocks of this type. However, since there's a new tile entity for each placed block one can modify fields in any way one would like inside the tile entity. This allows us to save how much information we would like, compared to only the 16 different metadata values that we had access to.

Answer to Question 2

To assign a tile entity to a block that base block must implement ITileEntityProvider. However, it's better, if possible, to just extend BlockContainer instead. When this is done, one must override the method ”TileEntity createNewTileEntity(World world)”. This method should return a new instance of your tile entity. When this is done your block will automatically get a new instance of the tile entity when it is being placed.

The tile entity itself must extend the TileEntity class and must be registered in the GameRegistry as well.

Possible solution to Exercise 1

```
package example.blocks;

import net.minecraft.block.Block;
import net.minecraft.block.BlockContainer;
import net.minecraft.block.material.Material;
import net.minecraft.client.renderer.texture.IconRegister;
import net.minecraft.creativetab.CreativeTabs;
import net.minecraft.tileentity.TileEntity;
import net.minecraft.util.Icon;
import net.minecraft.world.IBlockAccess;
import net.minecraft.world.World;
import cpw.mods.fml.relauncher.Side;
import cpw.mods.fml.relauncher.SideOnly;
import example.tileentities.TileEntityNumber;

//the block class
public class BlockNumber extends BlockContainer {

    protected BlockNumber(int id) {
        super(id, Material.rock);

        setCreativeTab(CreativeTabs.tabDecorations);
        setHardness(1F);
        setStepSound(Block.soundStoneFootstep);
        setUnlocalizedName(BlockInfo.NUMBER_UNLOCALIZED_NAME);
    }

    @Override
    public TileEntity createNewTileEntity(World world) {
        return new TileEntityNumber();
    }

    @SideOnly(Side.CLIENT)
    private Icon[] icons;

    @SideOnly(Side.CLIENT)
    @Override
    public void registerIcons(IconRegister register) {
        icons = new Icon[BlockInfo.NUMBER_COUNT];
        for (int i = 0; i < icons.length; i++) {
            icons[i] = register.registerIcon(BlockInfo.TEXTURE_LOCATION + ":" +
BlockInfo.NUMBER_TEXTURE + (i + 1));
        }
    }

    @Override
    @SideOnly(Side.CLIENT)
    public Icon getBlockTexture(IBlockAccess world, int x, int y, int z, int side) {
        TileEntityNumber tile = (TileEntityNumber)world.getBlockTileEntity(x, y, z);

        return icons[tile.getNumber()];
    }

    //a default icon
    @Override
    @SideOnly(Side.CLIENT)
    public Icon getIcon(int side, int meta) {
        return icons[0];
```

```
	}

}

package example.tileentities;

import example.blocks.BlockInfo;
import net.minecraft.tileentity.TileEntity;

//the tile entity class
public class TileEntityNumber extends TileEntity {

	private int number;
	private int tick;


	@Override
	public void updateEntity() {
		if (!worldObj.isRemote && ++tick == 20) {
			number = (number + 1) % BlockInfo.NUMBER_COUNT;

			worldObj.addBlockEvent(xCoord, yCoord, zCoord, BlockInfo.NUMBER_ID,
1, number);

			tick = 0;

		}
	}

	@Override
	public boolean receiveClientEvent(int id, int value) {
		if (worldObj.isRemote && id == 1) {
			number = value;

			worldObj.markBlockForRenderUpdate(xCoord, yCoord, zCoord);
		}

		return true;
	}

	public int getNumber() {
		return number;
	}


}

package example.blocks;
```

```
import net.minecraft.block.Block;
import net.minecraft.item.ItemStack;
import cpw.mods.fml.common.registry.GameRegistry;
import cpw.mods.fml.common.registry.LanguageRegistry;
import example.tileentities.TileEntityNumber;
public class Blocks {

    public static Block number;

    //called from the mod's pre-init
    public static void init() {
        number = new BlockNumber(BlockInfo.NUMBER_ID);
        GameRegistry.registerBlock(number, BlockInfo.NUMBER_KEY);
    }

    //called from the mod's init
    public static void addNames() {
        LanguageRegistry.addName(number, BlockInfo.NUMBER_NAME);
    }

    //called from the mod's init
    public static void registerTileEntities() {
        GameRegistry.registerTileEntity(TileEntityNumber.class,
BlockInfo.NUMBER_TE_KEY);
    }

}

package example.blocks;

public class BlockInfo {

    public static final String TEXTURE_LOCATION = "example";

    public static int NUMBER_ID;
    public static final String NUMBER_KEY = "Number";
    public static final int NUMBER_DEFAULT = 2078;

    public static final String NUMBER_UNLOCALIZED_NAME = "numberBlock";
    public static final String NUMBER_NAME = "Number Block";

    public static final String NUMBER_TEXTURE = "number_";

    public static final int NUMBER_COUNT = 18;

    public static final String NUMBER_TE_KEY = "numberTileEntity";
}
```

Possible solution to Exercise 2

```
package example.blocks;

import net.minecraft.block.Block;
import net.minecraft.block.BlockContainer;
import net.minecraft.block.material.Material;
import net.minecraft.client.renderer.texture.IconRegister;
import net.minecraft.creativetab.CreativeTabs;
import net.minecraft.entity.player.EntityPlayer;
import net.minecraft.tileentity.TileEntity;
import net.minecraft.util.Icon;
import net.minecraft.world.World;
import cpw.mods.fml.relauncher.Side;
import cpw.mods.fml.relauncher.SideOnly;
import example.tileentities.TileEntityClicker;

public class BlockClicker extends BlockContainer {

        public BlockClicker(int id) {
                super(id, Material.iron);

                setCreativeTab(CreativeTabs.tabBlock);
                setHardness(2F);
                setStepSound(Block.soundMetalFootstep);
                setUnlocalizedName(BlockInfo.CLICKER_UNLOCALIZED_NAME);
        }

        @Override
        public TileEntity createNewTileEntity(World world) {
                return new TileEntityClicker();
        }

        @Override
        public void onBlockClicked(World world, int x, int y, int z, EntityPlayer player) {
                ((TileEntityClicker)world.getBlockTileEntity(x, y, z)).click(true);
        }

        @Override
        public boolean onBlockActivated(World world, int x, int y, int z, EntityPlayer player, int side, float hitX, float hitY, float hitZ) {
                ((TileEntityClicker)world.getBlockTileEntity(x, y, z)).click(false);

                return true;
        }
```

```
    @SideOnly(Side.CLIENT)
    private Icon linked;
    @SideOnly(Side.CLIENT)
    private Icon unlinked;

    @Override
    @SideOnly(Side.CLIENT)
    public void registerIcons(IconRegister register) {
        linked = register.registerIcon(BlockInfo.TEXTURE_LOCATION + ":" +
BlockInfo.CLICKER_LINKED_TEXTURE);
        unlinked = register.registerIcon(BlockInfo.TEXTURE_LOCATION + ":" +
BlockInfo.CLICKER_TEXTURE);
    }

    @Override
    @SideOnly(Side.CLIENT)
    public Icon getIcon(int side, int meta) {
        return meta == 0 ? linked : unlinked;
    }
}

package example.tileentities;

import net.minecraft.nbt.NBTTagCompound;
import net.minecraft.tileentity.TileEntity;

public class TileEntityClicker extends TileEntity {

    private int clickOffset = 0;

    public void click(boolean isLeftButton) {
        clickOffset += isLeftButton ? -1 : 1;

        worldObj.setBlockMetadataWithNotify(xCoord, yCoord, zCoord, clickOffset == 0 ?
0 : 1, 3);
    }

    @Override
    public void writeToNBT(NBTTagCompound compound) {
        super.writeToNBT(compound);

        compound.setInteger("Clicks", clickOffset);
    }


    @Override
    public void readFromNBT(NBTTagCompound compound) {
        super.readFromNBT(compound);
```

```
		clickOffset = compound.getInteger("Clicks");
	}


}

package example.blocks;

public class BlockInfo {

	public static int CLICKER_ID;
	public static final String CLICKER_KEY = "Clicker";
	public static final int CLICKER_DEFAULT = 2078;

	public static final String CLICKER_UNLOCALIZED_NAME = "clickerBlock";
	public static final String CLICKER_NAME = "Clicker Machine";

	public static final String CLICKER_LINKED_TEXTURE = "clicker_linked";
	public static final String CLICKER_TEXTURE = "clicker";

	public static final String CLICKER_TE_KEY = "clickerTileEntity";

}

package example.blocks;

import net.minecraft.block.Block;
import net.minecraft.item.ItemStack;
import cpw.mods.fml.common.registry.GameRegistry;
import cpw.mods.fml.common.registry.LanguageRegistry;
import example.tileentities.TileEntityClicker;

public class Blocks {


	public static Block clicker;

	public static void init() {
		clicker = new BlockClicker(BlockInfo.CLICKER_ID);
		GameRegistry.registerBlock(clicker, BlockInfo.CLICKER_KEY);
	}

	public static void addNames() {
		LanguageRegistry.addName(clicker, BlockInfo.CLICKER_NAME);
	}
	public static void registerTileEntities() {
		GameRegistry.registerTileEntity(TileEntityClicker.class,
BlockInfo.CLICKER_TE_KEY);
	}

}
```