

Cycle 4 : 5*ème*

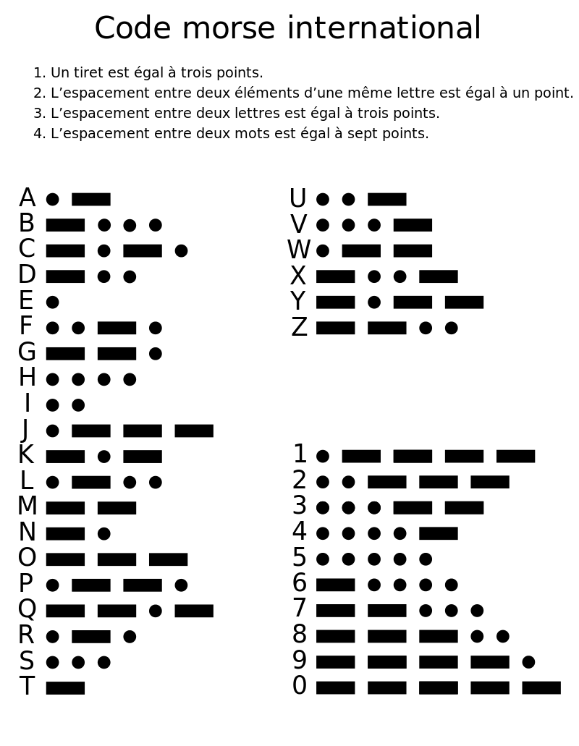
**Séquence 4**

ACTIVITE N°4

Consignes 1/2

**Programmer un objet technique**

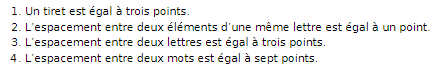
Comment améliorer la communication à courte distance?

**Rappels : Le code Morse** Mise en situation *(le prof anime la classe)15 minutes*

En cours de physique, vous avez pu observer et essayer de communiquer avec des signaux lumineux et sonores codés en respectant le code morse.

* Appui court : point (.),
* Appui long : tiret (---)





Rythme à respecter

*Il faut de l’entrainement et bien garder le rythme dans les appuis pour communiquer de manière fiable*.

**Mission : fiabiliser la communication**

Des erreurs ont été relevées, l’origine de l’erreur a été expliquée. *Le prof montre les erreurs au tableau*

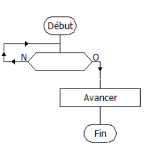
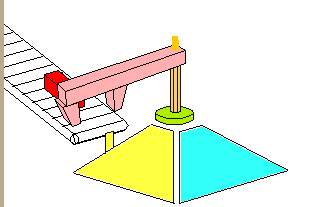
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| --- | --- | --- | --- | --- | --- |
| Message à coder | Message à envoyer | Message envoyé | Message lu | Message décrypté | Pourquoi cette erreur ? |
| SUD | **… ..--- ---..** | ··· ··--- --·· | **…  ..--- ...** | SUS | Durée point et tiret mal exécutée, trait confondu avec point, le D devient S |
| SUD | **… ..--- ---..** | ··· · ·--- -- -- · | **…. .--- …** | HAS | Chaque lettre est codée avec un nombre d’éléments différents, suivant le rythme des appuis des éléments et le rythme du codage entre les lettres, tout se décale et se mélange. |

*Pour rendre la communication fiable, on vous demande de perfectionner et fiabiliser la communication avec les outils d’aujourd’hui en utilisant la carte programmable autoprog, des boutons poussoirs, des led et buzzer.*

**Matériel nécessaire** par ilot (6 élèves par ilot)

* 1 boitier autoprog et son câble USB
* 4 modules boutons poussoir
* 1 module éclairage,
* 1 module buzzer
* 4 modules led de couleurs différentes
* Un ordinateur
* logiciel picaxe éditor 6

**Organisation pour chaque problème à résoudre**, 2 élèves câblent, 2 élèves font le programme, deux élèves préparent un mot court codé (6 lettres maximum). Pour chaque problème les rôles sont changés. Les programmes à finaliser sont enregistrés par le nom du problème sur le serveur de la salle dans le dossier de la classe. Le programme de chaque problème est enregistré sur le serveur de la salle en respectant l’adressage donné.



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**Séquence 4**

ACTIVITE N°4

Consignes 2/2

**Programmer un objet technique**

Comment améliorer la communication à courte distance?

*60minutes Les élèves travaillent en ilot en respectant l’organisation et le matériel ; sur une copie ils écrivent chaque problème à résoudre et leurs remarques. Le prof vérifie après chaque problème.*

|  |  |  |
| --- | --- | --- |
| Point | . | 1 seconde |
| Tiret | --- | 3 secondes |

**Problème à résoudre n°1**  : Différencier le point et le tiret par deux entrées distinctes pour générer pour chacune des entrées une durée différente de lumière et de son.

Réaliser le câblage, terminer le programme et tester avec un court mot codé (seuls les élèves codeurs connaissent le mot et le saisissent à l’abri du regard des autres qui ne voient que la lumière en sortie). Vous noterez ensuite vos remarques en groupe.

*Il faut écrire à quoi correspondent les boutons d’entrée. On ne perçoit pas facilement la fin de la lettre*

**Problème à résoudre n°2**  : On ajoute une entrée supplémentaire pour coder la fin de la lettre qui génèrera une absence de lumière et de son pendant 3 secondes.

Ajouter l’entrée sur le câblage, améliorer le programme et vérifier avec un autre mot codé (seuls les élèves codeurs connaissent le mot et le saisissent à l’abri du regard des autres qui ne voient que la lumière en sortie). Vous noterez ensuite vos remarques en groupe.

*Il faut rester très concentré pour distinguer les différentes durées, l’envoi est très long*

|  |  |  |  |
| --- | --- | --- | --- |
| Point | . | 0.5 seconde | Couleur rouge |
| Tiret | --- | 1.5 seconde | Couleur verte |
| Fin lettre |  | 1.5 seconde | Couleur bleue |

**Problème à résoudre n°3**   Afin d’accélérer la durée des envois et de préciser le décryptage on veut distinguer le signal de sortie point, du tiret et de la fin de lettre en utilisant des couleurs différentes.

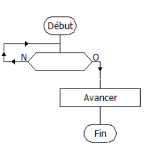
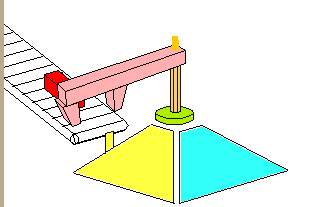
Réaliser le câblage, le programme et tester avec un mot codé (seuls les élèves codeurs connaissent le mot et le saisissent à l’abri du regard des autres qui ne voient que le signal lumineux en sortie). Vous noterez ensuite vos remarques en groupe.

*Moins d’erreur, il faut connaitre le code couleur et noter la correspondance couleur signe*

**Problème à résoudre n°4 (pour les plus rapides)** On veut coder une phrase de 3 mots maximum, il faudra distinguer la fin du mot.

Proposer une solution et la tester.

*15 minutes* doc synthèse élève



**Programmer un objet technique**

**Séquence 4**

ACTIVITE N°4

1/2

Cycle 4 : 5*ème*

*Nom :*

Comment améliorer la communication à courte distance?

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|  | **Compétences développées en activités** | **Connaissances associées** |
| **C 4.2** | Appliquer les principes élémentaires de l’algorithmique et du codage à la résolution d’un problème simple. | Notions d’algorithme et de programme. Déclenchement d'une action par un événement, instructions conditionnelles. |
| **C 5.1** | Simuler le comportement d’un objet | Vérification respect cahier des charges validation |

Codage des signes Morse

Chaque signe est distingué par une

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Décodage du signal lumineux émis

Chaque signe est distingué par une

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



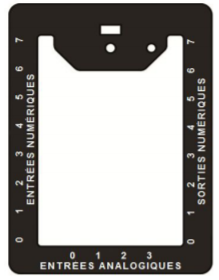
POINT **·**

FIN LETTRE

TIRET **---**

FIN MOT





POINT **·**

FIN LETTRE

TIRET **---**

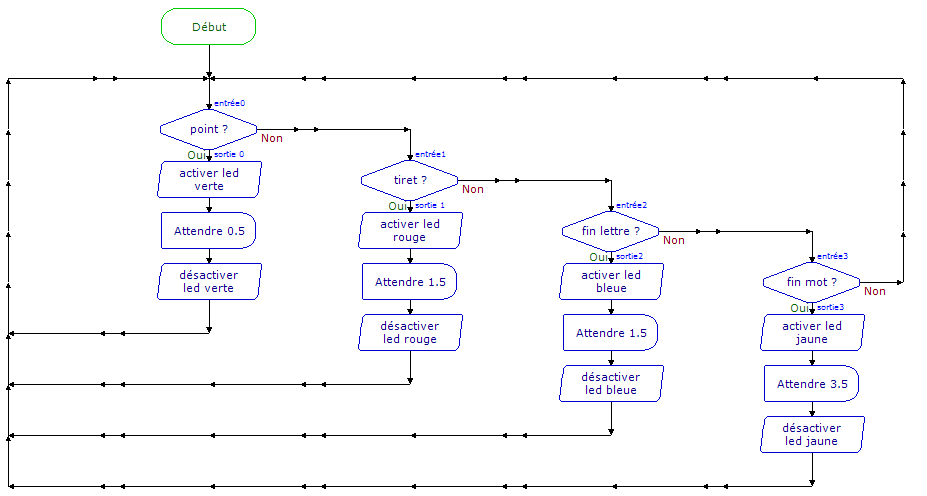
FIN MOT

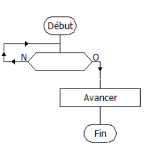
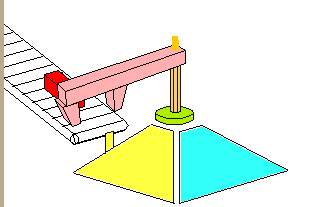






*Dessine* ci-dessus *les câbles* correspondants au programme écrit sous forme d’organigramme





Cycle 4 : 5*ème*

**Séquence 4**

ACTIVITE N°4

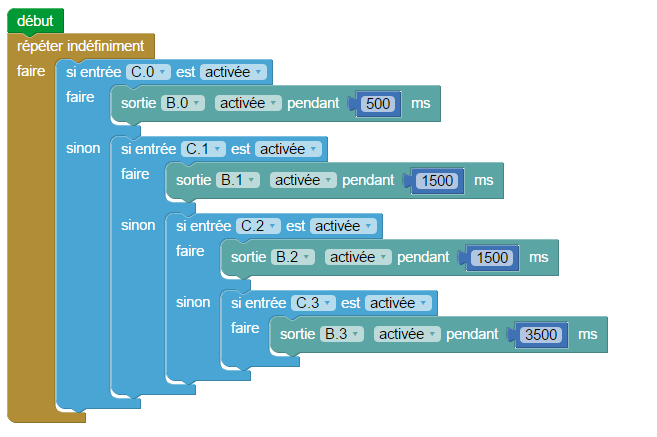
2/2

**Programmer un objet technique**

*Nom :*

Comment améliorer la communication à courte distance?

Complète la table d’entrées sorties correspondante au programme ci-dessous



**Table entrées/sorties**

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|  |  |  |  |
| --- | --- | --- | --- |
| ENTREES |  | SORTIES |  |
| C\_\_\_ | Bouton poussoir point | B\_\_\_ | LED VERTE |
| C\_\_\_ | Bouton poussoir tiret | B\_\_\_ | LED ROUGE |
| C\_\_\_ | Bouton poussoir fin lettre | B\_\_\_ | LED BLEUE |
| C\_\_\_ | Bouton poussoir fin mot | B\_\_\_ | LED JAUNE |

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