Planning the Green, Blue, Brown and Black Courses

Introduction
The previous four articles in this series have covered planning the White, Yellow, Orange and Light Green courses. This article covers the planning of the technically hardest courses, so in the progression of the use of orienteering skills we are now at 'Technical Difficulty 5' (TD5). It is the technical difficulty for Green, Blue, Brown and Black courses on the Colour Coded system, and the age class courses for M/W16A and older. All of these require a similar type of planning.

Please note that this article does not cover all the mechanics of being the planner for an event (see Graham Nilsen's Course Planning manuscript for that), and assumes that you have a map that is accurate, that any 'Out of Bounds' areas have been identified, and that the area is generally suitable for the type of event to be staged.

What are we trying to provide for the competitors ?
Competitors on these courses should have mastered all the basic skills of orienteering and be able to read the information on the map and interpret it in relation to the ground. A planner should now be aiming to test the most advanced techniques of the sport:

- Navigating for long distances using only major contour features – hills, ridges, large re-entrants and spurs.
- Reading and interpreting complex contours.
- Concentration over long distances.
- Recognition of indistinct, but accurately mapped, features.
- Determining the best route choice - the ability to evaluate when to go straight and when to go round.
- Appropriate use of all the different skills, adapting speed and technique to changes in the terrain and orienteering difficulty.

Competitors should be pushed to the limits of their navigational skill, but not into the realms of chance. Control sites may be far from obvious relocating features so errors can result in a large time loss due to the difficulty in relocating in complex or repetitive terrain close to the control. However you should never use 'Bingo' controls in an attempt to make the course seem harder (see later).

General considerations
The vast majority of British terrain, particularly in England, does not support an entire course of TD5 difficulty legs. The higher quality orienteering areas in parts of the country allow most of the course to be planned at this level. In other areas small pockets of land allow one or two legs of this difficulty. However good planning can still set sufficient challenges to separate the best from the not so competent, and provide an enjoyable experience for all.

The nature of the terrain over which the competitors will be running should be considered for all age groups:

- Areas of dense undergrowth (e.g. rhododendrons) or which are very difficult underfoot (e.g. boulder fields), do not test the orienteering skills of 'running navigation' and so should be avoided.
- Steep ascents and descents, whilst acceptable for M/W21, should be kept to a minimum for older competitors.
- Features such as fences which may provide significant obstacles for the less agile older competitors should be taken into account.
- Courses should avoid offering route choices that may tempt competitors into physical danger or into 'Out of Bounds' areas.

Whatever the area, at this level of difficulty the aim of the Planner must be to provide courses that best exploit the terrain that is available.

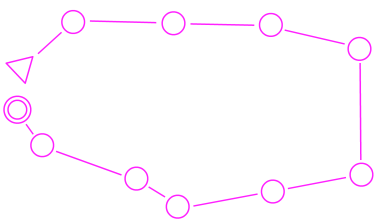
How long should the courses be ?
Guidance on the length of the TD5 courses is given in two ways:

- As the ratio of the length of a (sometimes hypothetical) M21 Long or Black course which would be won by a top M21 Elite competitor in about 67 minutes. This is always the case for Age Class related courses, and is also provided for Colour Coded courses. By including an allowance for height climb it enables a fairly accurate estimate of the required lengths. (Course length ratios refer to course lengths which are "corrected" for height climb by adding 0.1 km for every 10m of climb.) Using this method the course length ratios are Black = 1.0; Brown = 0.77; Blue = 0.56; Green = 0.39.
- Within a given length range: Green 3.5 - 5.0 km; Blue 5.5 - 7.5 km; Brown 7.5 - 10.0 km; Black > 10 km. This is a useful check that Colour Coded courses are the distance competitors will expect. Remember that these are actual lengths. The affect of height climb being allowed for when considering which end of the range to use at a particular event. It is important to get the course lengths at the right end of these ranges. At the lower end if the terrain is complex or physically slow. At the higher end if it is less complex and relatively fast. Furthermore, if you find yourself with a Green course of 4.0 km and a Blue course of 7.0 km then you have probably got something wrong.

With most M21L / Black courses being in the range 10.0 km to 14.0 km the result of using either method should be similar.

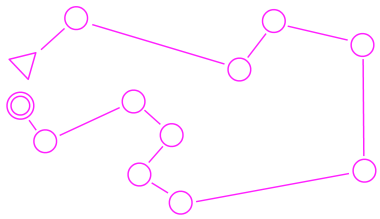
Basic Approach
In British terrain the hardest legs to plan are the long legs, so before doing anything else look to see where these might go.
Plot these on to the map and then start to build the rest of the course around them. Next, look for the parts of the area that the competitors will most enjoy - white runnable forest, intricate contour detail - and plan short legs that best exploit these parts of the map. In an ideal world the combination of these long and short legs would produce an entire course. Unfortunately that is rarely the case as factors such as start and finish locations, out of bounds areas, etc. need to be taken into account, so some less testing legs to link these together become unavoidable.

The Shape of the course
Try to set legs of different lengths and make the shape of the course look interesting by changes of direction. Many legs of similar length and direction result in this shape of course and competitor boredom.



Map1 : *Not good*

Whereas this shape breaks up the competitor's rhythm making concentration more difficult.

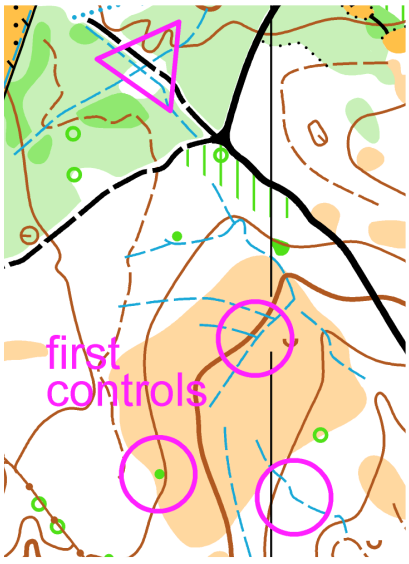


Map2 : *Good*

Vary the skills required between legs as much as possible to force regular changes in technique. If the area has two types of terrain, then try and run competitors between them. e.g. a number of short legs through technical forest followed by some longer legs through fast open land and then a return to the technical area. Many competitors will be lulled into a false sense of security by the easy running across the open land and fail to slow down sufficiently when re-entering the forest.

The Start and First Leg

The location of the start is usually dictated by the requirements of the technically easier courses. In theory the position of the start and the map issue point should be such that competitors waiting to start cannot see the route taken by competitors who have started. However this is often an impractical arrangement. Much easier is to have the Start line and start triangle positioned such that all competitors initially head off in the same direction, with route choice only being required once out of sight of the start.



Map3 : *Leaving the Start - no route choice for anyone until they reach the track junction*

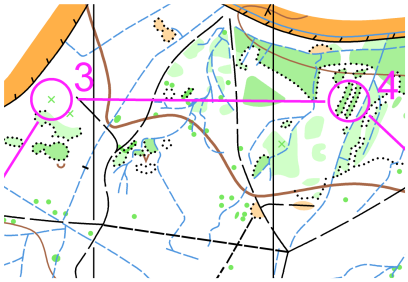
Some planners like to have a long leg to the first control with plenty of route choice. This may be acceptable if the map is a true reflection of the runnability of the area, but generally it is better to leave this type of leg until the competitor has a feel for how the mapper has represented the vegetation. Finally, check that there are no route choice options which have competitors returning through the start boxes on their way to the first control site. First legs for which a reasonable route goes straight back through the start never make the planner look particularly intelligent.

Planning individual legs

Having got the start and finish locations agreed, ideas for some long legs, and the basic shape of the course identified, the task now is to join potential control sites together with as many good legs as possible. So what should we be looking for in planning these legs?

Route choices

The competitor should be made to determine which is the best of several different choices of route. They must have the ability to evaluate when to go straight and when to go round. This may be to avoid hills or slower running, or to provide simpler navigation. Competitors with different strengths and weaknesses will select the different routes, but a good route choice leg should usually mean that the route with the more difficult navigation will take the least time if executed properly.



Map4 : *The direct route requires careful navigation, but is significantly shorter than the alternatives*

However one thing that cannot be stressed too highly is that making the route choice decision must be fair. It must be possible to decide between the various options solely from the information available. If the map says the forest is white then it should be runnable, not full of bracken or brambles.

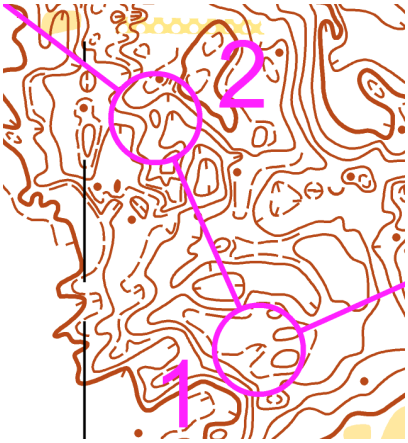
Long legs

What are the attributes of a good long leg ? Usually there must be several possible routes. Routes should either go almost entirely cross country, or link together many different paths with problems posed throughout the leg. A long route choice leg which only requires one decision at the start of the leg does not do this, and is often very poor, resulting in just a long but simple track run.

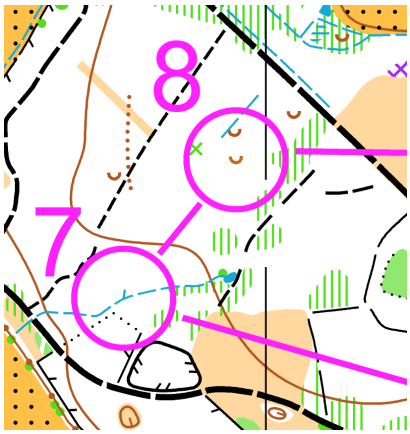
Long legs with lots of route choice are ideal, but they do not necessarily have to do this. When there isn't too much route choice the challenge is to retain concentration over a long period of time. It is easy for the competitor to switch off when navigating for long distances using only major contour features such as hills, ridges, large re-entrants and spurs. Parallel and miss-counting errors are prevalent in these types of leg.

Short legs

These are used to test fine map reading skills, compass and distance judgement, and reading and interpreting complex contours. The best routes will generally be fairly straight, and through the terrain. The problem is to follow the routes rather than select them. Beware that potentially good small areas of detail can be wasted by having courses either run through them, with simple relocation on the other side, or by using control sites with obvious attack points very close to them.



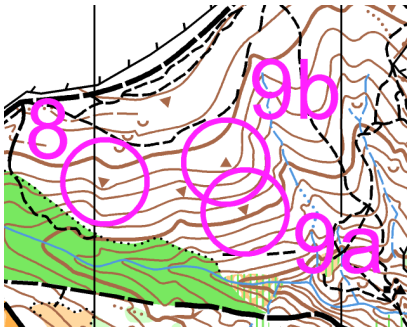
Map5 : *Complex contours*



Map6 : *Compass and pacing*

Contouring legs

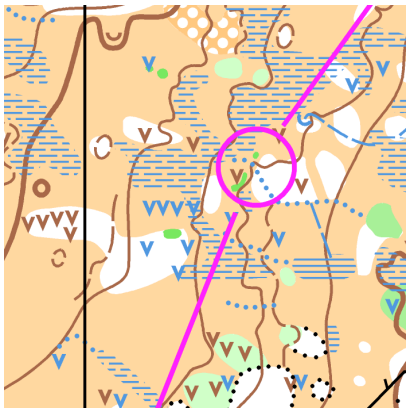
What are the attributes of good contouring legs ? Legs along the same contour are acceptable but not brilliant. When along a straight slope they are not particularly difficult, but are significantly better if they involve going across spurs and re-entrants where it is easy to lose height. However both of these do tend to lead to elephant tracks. Diagonal legs across slopes are much harder and tend to spread competitors out more.



Map7 : *Leg 8 to 9a is significantly better than 8 to 9b*

Recognition of indistinct features.

Navigating using indistinct contour features represented by just one contour in complex terrain tests the ability to relate small scale relief to contour detail on the map. This also gives the option of running roughly into the vicinity of the control, relocating using the available contour detail, and then approaching the control itself. Note that indistinct does not include those features that should not have been mapped in the first place.



Map8 : *Indistinct but fair contour features*

Choosing Control sites

Any feature, particularly those demanding careful map reading to locate, can be used as a control site but remember:

- Features used as control sites must be clearly defined, distinct from the surrounding terrain, and marked on the map.
- Control sites must be chosen so that the competitor can locate them with accuracy consistent with the scale of the map and the amount of detail shown near the control.
- It is the navigation between controls which is important, not finding control banners hidden in vegetation or down pits when you get there.

Proximity of Controls

The minimum separation of control sites should be 30 metres, and controls within 60 metres of each other should not be positioned on similar features or on features that appear similar in the terrain.

- There is usually little point in putting controls closer together than 30m - competitors are, in effect, navigating to the same point. (One allowable exception to this rule might be, for example, when one control is on a point feature, 20m inside the forest, used by the technical courses, whilst the other is on a path junction used by the White and Yellow courses.)
- Be pessimistic when interpreting 'features which appear similar in the terrain'. It is clearly unacceptable to claim that 'boulder (2 m) NE side' and ' boulder (1 m) SW side' are different - they are both boulders. But 'similar features' does not just mean those mapped with the same symbol. It is unfair, for instance, to use both a fence and a ruined fence; and mossy 1m boulders and 1m knolls often appear similar. Also beware that although paths and rides are obvious ones not to mix, many vegetation boundaries have paths along them (or develop them as an event takes place).

Essentially, do not use any close combination of controls which could be confused by competitors. It must always be possible for a competitor to decide from the map which control to go to without needing to rely on the control code, and to do so quickly and accurately.

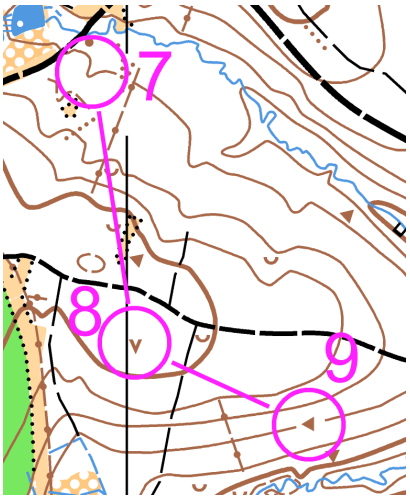
The purpose of a Control's Location

Every control site should have a purpose. This can be one or more of:

- Providing the end of a good leg that tests route choice and map reading skills.
- Setting up a good leg. This may be at the end of a relatively simple short leg to move the competitor to a better starting point for the next one.
- Avoiding a dog leg.
- Guiding competitors around a dangerous or out of bounds area, or leading them into a compulsory crossing point.
- To mark the beginning and end of a timed out section such as a road crossing.

Quite often too many controls are used. Use only as many as necessary for good planning based on the length of the course.

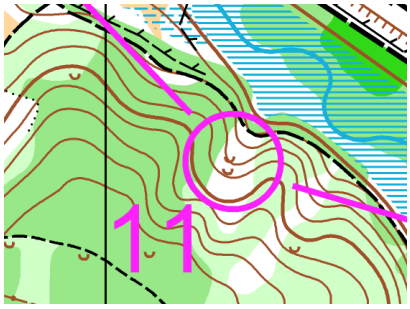
Once you think you have finished planning the course think again. Would the course be just as good or even better if a particular control was left out ?



Map9 : *OK, but better if control 8 is removed*

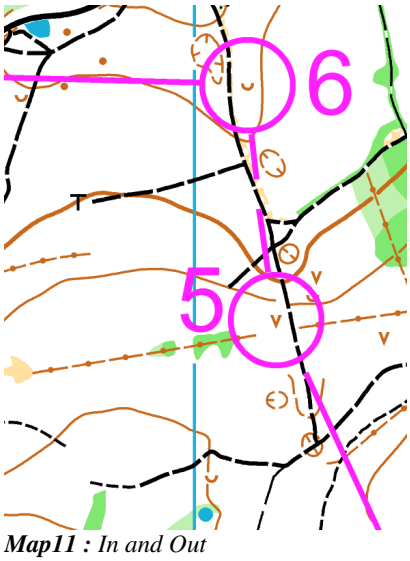
Legs and Control Sites to avoid
As well as being able to find good legs and control sites, the planner also needs to be able to recognise the characteristics of those to avoid.

Dog legs
A Dog Leg occurs when the optimum route in = the reverse of the optimum route out. This usually results in very heavy elephant tracks, as well as competitors being lead into the control by other runners leaving it. To determine if a control is a Dog Leg you have to consider the route competitors will take, not just the angle between the red lines.



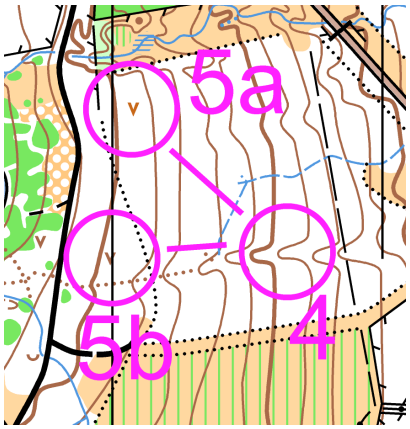
Map10 : *Although the angle between the lines may seem ok, in execution the control is a dog leg*

Rowing boat legs
So called because they are 'in and out' legs. The difficulty of these depends on whether or not the competitor arrives just as someone else is re-emerging onto the path.



Map11 : *In and Out*

Climbing legs
Legs that go straight up the side of a hill aren't particularly technically challenging. If you must go up, go across the slope. Also, whilst the view from a summit may be very scenic, it won't have been hard to find and most competitors won't thank you for it.



Map12 : *From 4 to 5a is ok, but 5b is not.*

Out of Bounds
Don't tempt competitors to go out of bounds. Plan the course such that there is absolutely no benefit to be gained by doing so. Similar considerations apply when competitors must use compulsory crossing points. If it is quicker not to use them then someone usually won't.

Control sites
Orienteering isn't a treasure hunt, and searching for control banners in thick vegetation or down pits is not part of the sport. Hence banners must not be:

- hidden - e.g. pushed right up beside a tree rather than clearly placed in the middle of a re-entrant
- excessively isolated - a map is only so accurate. The thickness of a line representing a path is 0.25 mm, the top of a pit 0.7mm - representing 3.75metres and 10.5 metres respectively. General guidance is that a control site requiring compass and pacing should normally be visible from 10% of the distance of the nearest attack point.
- a 'Bingo' control. The ability to locate the control should not be determined by whether or not another competitor is standing at the location. Pits and depressions in heather or bracken are definitely to be avoided.

The Finish
It is not good practice to have the finish on a feature in the middle of nowhere. The route to the finish should be obvious from the final control, and it is sensible for all courses to have the same or a very similar last leg to bring everyone into the finish from the same direction. However, when doing this ensure that the final control and finish are sufficiently distinct from each other that no-one is going to miss out the final control by accident.

End result
If your courses follow all the principles outlined in this article then you should have some very satisfied customers. Talk to them after they have run to find out what they have enjoyed and what they think could have been better. You will usually learn something, even if it is only to reinforce the impression that the feedback depends on how well the competitor has performed, and that all the mistakes were the fault of the map.

Map Credits:
Map extracts courtesy of Bruce Bryant (Bentley Woods,, Sutton Park); Mike Elliot (White Downs); Mike Hampton (Hay Wood); Jon Musgrave / SOA (Culbin); Alison Sloman (Breakneck Bank, Malvern Hills); Colin Spears (Brown Clee).

References:

- Course Planning by Graham Nilsen
- British Orienteering Rules
- British Orienteering Appendix B - Course Planning

all of which can be found on the British Orienteering web site via Event Information / Event officials / Planners.

Author:
Barry Elkington. April 2009.
Octavian Droobers Orienteering Club